PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2001-067674

(43)Date of publication of application : 16.03.2001

(51)Int.Cl. G11B 7/0045

G11B 20/10

(21)Application number : 11-243458

(22)Date of filing : 30.08.1999

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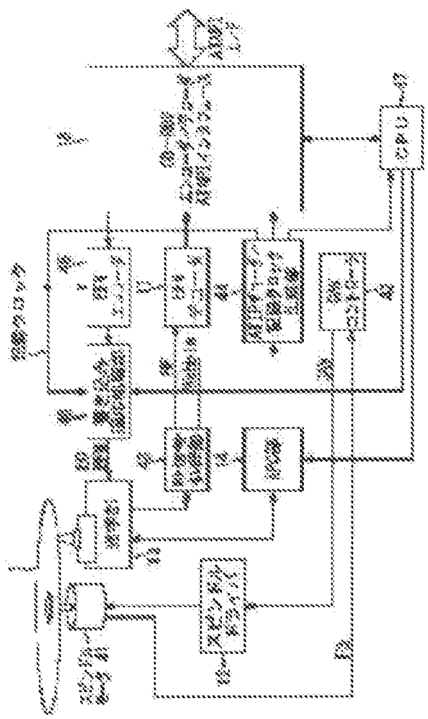
(54) DISK DRIVE AND METHOD, AND RECORDING MEDIUM



(57)Abstract:

PROBLEM TO BE SOLVED: To attain the quick recording by recording data on an information recording medium based on a generated clock corresponding to a linear velocity signal which is generated corresponding to the linear velocity of a track to be recorded with the data of the mounted information recording medium.

SOLUTION: A wobble signal of the mounted CD-R1 corresponding to the linear velocity of a pit track is generated by an RF signal processing part 43. The recording clock corresponding to the wobble signal is produced by an ATIP decoder/recording clock generating part 44. By an EFM encoder 45 and a write-in adaptive processing part 46, the data are recorded on the CD-R1 based on the recording clock.

LEGAL STATUS

[Date of request for examination] 10.03.2006

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

CLAIMS

[Claim(s)]

[Claim 1] The disk driving gear characterized by including a linear-velocity signal generation means to generate the linear-velocity signal corresponding to the linear velocity of the truck with which the data of the information record medium with which it is equipped are recorded, a clock generation means to generate the clock corresponding to said linear-velocity signal, and a record means to record said data on said information record medium based on said clock.

[Claim 2] Said linear-velocity signal is a disk driving gear according to claim 1 characterized by being generated from a Wobble signal.

[Claim 3] Said record means is a disk driving gear according to claim 1 characterized by including further a driving signal amendment means to amend the driving signal which drives said optical generating means, based on said clock including the optical generating means which emits the light which records said data to said information record medium.

[Claim 4] The disk driving gear according to claim 1 characterized by including further the adjustment device which adjusts the reinforcement of the laser beam which records data to said information record medium of said record means based on said clock.

[Claim 5] The disk drive approach characterized by including the linear-velocity signal generation step which generates the linear-velocity signal corresponding to the linear velocity of the truck with which the data of the information record medium with which it is equipped are recorded, the clock generation step which generates the clock corresponding to said linear-velocity signal, and the record step which records said data on said information record medium based on said clock.

[Claim 6] The record medium with which the program which the computer characterized by to be included the linear-velocity signal generation step which generates the linear-velocity signal corresponding to the linear velocity of the truck with which the data of the

information record medium with which it is equipped are recorded, the clock-generation step which generate the clock corresponding to said linear-velocity signal, and the record control step which control record of said data to said information record medium based on said clock can read is recorded.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to a record medium at the disk driving gear which can do record for a disk driving gear and an approach, and a list quickly especially about a record medium and an approach, and a list.
[0002]
[Description of the Prior Art] CD-R (Compact Disc-Recordable) drive equipment records predetermined data on CD-R with which it was equipped, or reproduces predetermined data from CD-R. At this time, CD-R drive equipment applies a spindle servo so that CD-R may be rotated with the rotational speed which becomes fixed [the linear velocity of a predetermined pit truck]. Moreover, a tracking servo, a focus servo, and a thread servo are applied so that the laser spot of the laser beam which the laser diode built in an optical pickup generates may follow the predetermined pit truck of CD-R and can record or reproduce data.
[0003] The configuration of conventional CD-R drive equipment is explained with reference to the block diagram shown in drawing 1 . The spindle rotated with a spindle motor 11 with the rotational speed which becomes fixed [the linear velocity of a predetermined pit truck] is equipped with CD-R1. The spindle driver 12 drives a spindle motor 11 so that it may become the rotational speed [be / fixed] based on the CLV (Constant Linear Velocity) signal supplied from the ATIP decoder 16 about the linear velocity of a predetermined pit truck.
[0004] The optical department 13 irradiates light from the laser diode (not shown) to build in in the signal side of CD-R1. The existence and the guide rail (it is also called PURIGURUBU or the guide groove) of a signal (pit) become irregular, and the light reflected from the signal side of CD-R1 is received with the detector of the optical department 13. The detector of the optical department 13 changes the light from CD-R1

into an electrical signal, and outputs it to RF (Radio Frequency) processing section 15.
[0005] The optical department 13 changes the output of a laser diode again based on the data which were supplied from the write-in adaptation processing section 21 and by which the EQFEM modulation was carried out, when writing data in CD-R1. The optical department 13 is driven to radial [of CD-R1] by the thread motor which is not illustrated.
[0006] The APC (Auto Power Control) section 14 adjusts the output of the laser diode of the optical department 13 based on control of CPU (Central Processing Unit)19.
[0007] From the signal detected with the detector, RF processing section 15 generates the regenerative signal (a RF signal is called hereafter) corresponding to a pit, and outputs it to the EFM (Eight to Fourteen Modulation) decoder 17. From the signal detected with the detector, RF processing section 15 generates the Wobble signal corresponding to a guide rail, and outputs it to the ATIP decoder 16. Since the linear velocity of a pit truck is fixed, a Wobble signal has a 22.05kHz**1kHz frequency, while recording data on CD-R1, or when having read data in CD-R1.
[0008] Moreover, the frequency modulation of the Wobble signal is carried out, and since the linear velocity of a pit truck is fixed, the clock frequency of the signal which restored to it has the fixed frequency of 6.30kHz, while recording data on CD-R1, or when having read data in CD-R1.
[0009] RF processing section 15 performs addition-and-subtraction processing of the signal detected with the detector again, generates a tracking error signal (TE (Tracking Error) signal is called hereafter) and a focal error signal (FE (Focus Error) signal is called hereafter), and outputs them to the servo driver which controls a tracking servo, a focus servo, and a thread servo and which is not illustrated.
[0010] The ATIP decoder 16 outputs the data in which rotation of a spindle is shown to a CD-ROM (Compact Disc-Read Only Memory) encoder / decoder ATAPI (AT Attachment Packet Interface) interface 18 while the optical department 13 generates the CLV signal which shows the linear velocity of the pit truck which is irradiating light and supplies it to the spindle driver 12 based on the Wobble signal supplied from RF processing section 15.
[0011] The EFM decoder 17 carries out the EFM recovery of the RF signal generated in RF processing section 15, changes it into the format for CD-ROM, and is outputted to a CD-ROM encoder / decoder ATAPI interface 18.
[0012] A CD-ROM encoder / decoder ATAPI interface 18 supplies the data supplied from the external device to the EFM encoder 20 while outputting the data supplied from the ATIP decoder 16 or the EFM decoder 17 through an ATAPI interface to the radical of control of CPU19 at an external device.
[0013] CPU19 controls a CD-ROM encoder / decoder ATAPI interface 18, the write-in adaptation processing section 21, and the APC section 14 based on the data inputted from the CD-ROM encoder / decoder ATAPI interface 18.
[0014] The EFM encoder 20 generates the EFM signal corresponding to the data inputted from the CD-ROM encoder / decoder ATAPI interface 18, and outputs it to the write-in adaptation processing section 21 with the record clock of the frequency of immobilization.
[0015] Based on the EFM signal and record clock which were supplied from the EFM encoder 20, the write-in adaptation processing section 21 generates an EQEFM (Equalized EFM) signal, and supplies it to the optical department 13.

[0016] Thus, conventional CD-R drive equipment applies a spindle servo so that data may be rotated with the rotational speed from which the linear velocity of the pit truck which is carrying out record or read-out becomes fixed.

[0017]

[Problem(s) to be Solved by the Invention] However, conventional CD-R drive equipment must wait for the engine speed of CD-R1 to change, and requires time amount for record of the data to CD-R1 until the linear velocity of a pit truck to record becomes fixed.

[0018] This invention is made in view of such a situation, and it aims at being made to be possible [record] quickly.

[0019]

[Means for Solving the Problem] A disk driving gear according to claim 1 is characterized by including a linear-velocity signal generation means to generate the linear-velocity signal corresponding to the linear velocity of the truck with which the data of the information record medium with which it is equipped are recorded, a clock generation means to generate the clock corresponding to a linear-velocity signal, and a record means to record data on an information record medium based on a clock.

[0020] A linear-velocity signal is generable from a Wobble signal.

[0021] A record means can establish further a driving signal amendment means to amend the driving signal which drives an optical generating means, based on a clock including the optical generating means which emits the light which records data to an information record medium.

[0022] A disk driving gear can prepare further the adjustment device which adjusts the reinforcement of the laser beam which records data to the information record medium of a record means based on a clock.

[0023] The disk drive approach according to claim 5 is characterized by including the linear-velocity signal generation step which generates the linear-velocity signal corresponding to the linear velocity of the truck with which the data of the information record medium with which it is equipped are recorded, the clock generation step which generates the clock corresponding to a linear-velocity signal, and the record step which records data on an information record medium based on a clock.

[0024] A record medium according to claim 6 is characterized by to be recorded the program which the computer which performs processing containing the linear-velocity signal generation step which generates the linear-velocity signal corresponding to the linear velocity of the truck with which the data of the information record medium with which it is equipped are recorded, the clock-generation step which generate the clock corresponding to a linear-velocity signal, and the record control step which control record of the data to an information record medium based on a clock can read.

[0025] In a disk driving gear according to claim 1, the disk drive approach according to claim 5, and a record medium according to claim 6, the linear-velocity signal corresponding to the linear velocity of the truck with which the data of the information record medium with which it is equipped are recorded is generated, the clock corresponding to a linear-velocity signal is generated, and data are recorded on an information record medium based on a clock.

[0026]

[Embodiment of the Invention] Drawing 2 is the block diagram showing the configuration of the gestalt of 1 operation of the CD-R drive equipment concerning this invention. The same sign is given to the conventional case and the corresponding part, and the explanation is omitted suitably. A spindle motor 41 rotates a spindle with a predetermined rotational speed which is a constant angular velocity. CD-R1 with which the spindle is equipped rotates with a predetermined rotational speed which is a constant angular velocity. A spindle motor 41 outputs the electrical potential difference proportional to the rotational speed of a spindle to the CAV (Constant Angular Velocity) controller 42 as a FG (Frequency Generator) signal.

[0027] Based on FG signal supplied from the spindle motor 41, the CAV controller 42 controls the spindle driver 12 so that a spindle motor 41 rotates with a predetermined rotational speed which is a constant angular velocity.

[0028] From the signal detected with the detector, RF processing section 43 generates the Wobble signal corresponding to a guide rail, and outputs it to an ATIP decoder / record clock generation section 44 while it generates RF ** corresponding to a pit and outputs it to the EFM decoder 17 from the signal detected with the detector. The frequency and a recovery frequency change with the locations of the pit truck with which it recorded or read and the optical department 13 is carrying out the Wobble signal which RF processing section 43 of the CD-R drive equipment concerning this invention outputs to an ATIP decoder / record clock generation section 44 since the angular velocity of CD-R1 is fixed.

[0029] An ATIP decoder / record clock generation section 44 outputs the data in which rotation of a spindle is shown to a CD-ROM encoder / decoder ATAPI interface 18 while it generates the record clock of the predetermined frequency corresponding to the frequency and recovery frequency of a Wobble signal based on the Wobble signal supplied from RF processing section 43 and supplies it to the EFM encoder 45, the write-in adaptation processing section 46, and CPU47.

[0030] From the data inputted from the CD-ROM encoder / decoder ATAPI interface 18, the EFM encoder 45 generates an EFM signal based on the record clock supplied from an ATIP decoder / record clock generation section 44, and outputs it to it at the write-in adaptation processing section 46.

[0031] Based on the EFM signal supplied from the EFM encoder 45, and the record clock supplied from an ATIP decoder / record clock generation section 44, the write-in adaptation processing section 46 generates an EQEFM signal, and supplies it to the optical department 13. The write-in adaptation processing section 46 controls the reinforcement of the laser beam to which the optical department 13 irradiates CD-R1 based on the data supplied from CPU47.

[0032] CPU47 generates data for the write-in adaptation processing section 46 to control the reinforcement of the laser beam of the optical department 13 based on the frequency of the record clock supplied from an ATIP decoder / record clock generation section 44, and outputs them to the write-in adaptation processing section 46.

[0033] When recording data on CD-R1, the optical department 13 changes the reinforcement of a laser beam based on the EQEFM signal supplied from the write-in adaptation processing section 46.

[0034] Drawing 3 is drawing showing the configuration of the detector of the optical department 13, and RF signal-processing section 43. The optical department 13 irradiates the laser beam by which outgoing radiation was carried out from the laser diode to build in in the signal side of CD-R1. One laser beam irradiated is divided into one laser beam for signal reading (record), and two laser beams for tracking servos by the grating (diffraction grating) which is not illustrated at this time. That is, one laser beam is divided into three laser beams by the grating. And three laser beams from the reflector acquired by irradiating three laser beams in the signal side of CD-R1 are received by the detector 71-1 thru/or 71-3, respectively.

[0035] After the quadrisected sensors A and D detect a detector 71-1 and it carries out ******** conversion at electrical signals AP, BP, CP, and DP, it outputs the laser beam for signal reading reflected from CD-R1 to amplifier 72-1 thru/or 72-4. Amplifier 72-1 thru/or 72-4 amplify Signals AP and DP, respectively, and outputs them to an adder 73.

[0036] An adder 73 is adding the signals AP, BP, CP, and DP amplified by amplifier 72-1 thru/or 72-4 according to a degree type (1), generates a RF signal and outputs it to the EFM decoder 17.

[0037]

RF= (AP+BP+CP+DP) ... (1)

Amplifier 72-1 thru/or 72-4 output Signals AP, BP, CP, and DP to the Maine sample hold circuit 74 again, respectively.

[0038] The Maine sample hold circuit 74 outputs those signals to amplifier 75 while carrying out sample hold of the signals AP, BP, CP, and DP until the activity of predetermined A/D (Analog To Digital) conversion ends. Before it carries out sample hold of the signals AP, BP, CP, and DP, outputs them and writes data in CD-R1, or after writing in the Maine sample hold circuit 74 while writing data in CD-R1, only a sample performs Signals AP, BP, CP, and DP (** which is not held), and it outputs them to amplifier 75.

[0039] Amplifier 75 outputs the signal which added the inputted signals BP and CP, and added and generated them to AGC circuit 77 while outputting the signal which added the inputted signals AP and DP, and added and generated them to the AGC (Automatic Gain Control) circuit 76.

[0040] Amplifier 75 calculates the inputted signals AP, BP, CP, and DP again according to a degree type (2), and generates FE signal.

[0041]

FE=(AP+CP)-(BP+DP) ... (2)

Further, from the inputted signals AP, BP, CP, and DP, according to a degree type (3), amplifier 75 calculates an MPP (Main Push Pull) signal, and outputs it to a switch 79 and + input terminal of the differential amplifier 85.

[0042]

MPP=(AP+DP)-(BP+CP) ... (3)

AGC circuit 76 adjusts the amplitude so that the level of the signal adding the inputted signals AP and DP may be set to the same level as reference level as compared with predetermined reference level, and it outputs it to + input terminal of the differential amplifier 78.

[0043] AGC circuit 77 adjusts the amplitude so that the level of the signal adding the inputted signals BP and CP may be set to the same level as reference level as compared with predetermined reference level, and it outputs it to - input terminal of the differential amplifier 78.

[0044] The differential amplifier 78 computes the difference of the signal adding the signals AP and DP with which the amplitude was adjusted, and the signal adding the signals BP and CP with which the amplitude was adjusted, and supplies it to a switch 79.

[0045] A switch 79 outputs the signal supplied from the differential amplifier 85 to a band pass filter 80, after outputting and writing the MPP signal supplied from the amplifier 75 in a band pass filter 80 before writing it in while writing data in CD-R1 based on the signal supplied from the optical department 13 or. From the signal supplied from the switch 79, a band pass filter 80 removes the component below a predetermined frequency, and the component more than a frequency predetermined [other], and outputs them to an ATIP decoder / record clock generation section 44 as a Wobble signal.

[0046] After the sensors E and F divided into two detect the 1st laser beam for tracking servos reflected from CD-R1 and a detector 71-2 changes it into electrical signals EP and FP, respectively, it is inputted into amplifier 81-1 and 81-2. Amplifier 81-1 and 81-2 amplify Signals EP and FP, respectively, and output them to the side sample hold circuit 83. After the sensors G and H divided into two detect the 2nd laser beam for tracking servos reflected from CD-R1 and a detector 71-3 changes it into electrical signals GP and HP, respectively, it is outputted to amplifier 82-1 and 82-2. Amplifier 82-1 and 82-2 amplify Signals GP and HP, respectively, and output them to the side sample hold circuit 83.

[0047] The side sample hold circuit 83 inputs those signals into amplifier 84 while carrying out sample hold of the signals EP and FP for the 1st tracking servo, and the signals GP and HP for the 2nd tracking servo, respectively until the activity of A/D conversion ends. Before it carries out sample hold of the signals EP and FP for the 1st tracking servo and the signal GP for the 2nd tracking servo, and the HP **, outputs them and writes data in CD-R1, or after writing in the side sample hold circuit 83 while writing data in CD-R1, only a sample performs the signals EP and FP for the 1st tracking servo, and the signals GP and HP for the 2nd tracking servo, and it outputs them to amplifier 84.

[0048] From the inputted signals EP, FP, GP, and HP, according to a degree type (4), amplifier 84 calculates a SPP (Side Push Pull) signal, and outputs it to - input terminal of the differential amplifier 85.

[0049]

SPP=(FP+HP)-(EP+GP) ... (4)

The differential amplifier 85 calculates TE signal from the inputted MPP signal and a SPP signal according to a degree type (5).

[0050]

TE=MPP-SPP ... (5)

Next, the CD-R drive equipment concerning this invention explains to CD-R1 the actuation which writes in data with reference to the block diagram of drawing 4 based on the data supplied from the Wobble signal and the CD-ROM encoder / decoder ATAPI interface 18.

[0051] From the MPP signal generated with a detector 71-1, amplifier 72-1 or 72-4, the Maine sample hold circuit 74, and amplifier 75, a band pass filter 80 extracts only a predetermined frequency component, and outputs it to an ATIP decoder / record clock generation section 44 as a Wobble signal.
[0052] As CD-R1 is shown in drawing 5 and drawing 6 , PURIGURUBU (guide rail) is beforehand prepared in the transparency layer (it is also called a substrate) formed by the polycarbonate. When writing data in CD-R1 as compared with the time of reading data, CD-R drive equipment irradiates a strong laser beam along with PURIGURUBU, disassembles the organic coloring matter of a recording layer, and makes a pit form in CD-R1 by making a transparency layer deform. PURIGURUBU of CD-R1 has a number of wobbles (wave) defined beforehand to the predetermined die length of PURIGURUBU, as shown in drawing 6 . Therefore, the laser beam reflected from PURIGURUBU has vibration of the period corresponding to the wobble of PURIGURUBU.
[0053] The signal corresponding to vibration of the period corresponding to the wobble of PURIGURUBU is extracted as a Wobble signal. namely, the passing speed [as opposed to PURIGURUBU in the period of a Wobble signal] of a laser beam irradiated by PURIGURUBU -- in other words, the linear velocity of a pit truck is supported.
[0054] Moreover, the frequency modulation of the Wobble signal is carried out, and the phase of the clock signal which synchronized with the signal which restored to it synchronizes with the phase of the record clock at the time of recording data on a pit truck.
[0055] As compared with the predetermined threshold which was able to be defined beforehand, the supplied Wobble signal is made binary and the binary-ized circuit 101 of an ATIP decoder / record clock generation section 44 outputs it to the frequency comparator circuit 102. The frequency comparator circuit 102 compares the Wobble signal which was supplied from the binary-ized circuit 101 and which was made binary with the signal supplied from the frequency divider 105, and outputs the signal of the electrical potential difference corresponding to the delta frequency of a Wobble signal and the signal supplied from the frequency divider 105 to a low pass filter 103.
[0056] From the signal supplied from the frequency comparator circuit 102, a low pass filter 103 removes the component more than a predetermined frequency, and supplies the signal to VCO (Voltage Controlled Oscillator)104. VCO104 generates the signal of the frequency corresponding to the electrical potential difference after addition of the signal supplied from the low pass filter 103 and the low pass filter 111, and outputs it to a frequency divider 105, a frequency divider 112, and the EFM encoder 45.
[0057] A frequency divider 105 carries out dividing of the signal supplied from VCO104 to 1/196 (for example, if the signal supplied from VCO104 is 4.3218MHz, set to 22.05kHz), and outputs it to the frequency comparator circuit 102.
[0058] A phase comparator 106 compares the phase of the Wobble signal which was supplied from the binary-ized circuit 101 and which was made binary, and the signal supplied from VCO108, and outputs the signal of the electrical potential difference corresponding to the phase contrast to a low pass filter 107.
[0059] From the signal supplied from the phase comparator 106, a low pass filter 107 removes the component more than a predetermined frequency, and supplies the signal to

VCO108. Moreover, the output of a low pass filter 107 is supplied also to the binary-ized circuit 109, and the signal made binary is outputted to a phase comparator 110.

[0060] A phase comparator 110 compares the phase of the FMDT signal which was supplied from the binary-ized circuit 109 and which was made binary, and the signal supplied from the frequency divider 112, and outputs the signal of the electrical potential difference corresponding to the phase contrast to a low pass filter 111.

[0061] After a low pass filter 111 removes the component more than a predetermined frequency and adds the signal with the output of a low pass filter 103 from the signal supplied from the phase comparator 110, it is supplied to VCO104.

[0062] A frequency divider 112 carries out dividing of the signal supplied from VCO104 to 1/686, and outputs it to a phase comparator 110.

[0063] It is 196 times the frequency of a Wobble signal, and the clock frequency and phase of a FMDT signal synchronize, and the signal outputted to the EFM encoder 45 serves as a record clock which is 686 times the clock frequency of a FMDT signal from an ATIP decoder / record clock generation section 44.

[0064] When the frequency of a Wobble signal changes, an ATIP decoder / record clock generation section 44 follows the change, the frequency of section is as mentioned above first, and it acts so that a phase may next synchronize with the clock of a FMDT signal, and generates a record clock.

[0065] In addition, what is necessary is just to make 1/98 and the rate of dividing of a frequency divider 112 into 1/343 for the rate of dividing of a frequency divider 105, when a twice as many record clock as this is required.

[0066] The EFM encoder 45 divides into 8-bit data the data supplied from the CD-ROM encoder / decoder ATAPI interface 18, and transposes each to 14-bit predetermined data (0 which the replaced data follow becomes less than [2 / 10 or more] (only one zero is not inserted between one and continuous 11 or more 0 does not appear)). The EFM encoder 45 generates the signal reversed when 1 appears in the replaced 14-bit data, i.e., an EFM signal, based on the record clock supplied from an ATIP decoder / record clock generation section 44.

[0067] The EFM encoder 45 writes in an EFM signal and outputs it to the adaptation processing section 46. The equalizer 121 of the write-in adaptation processing section 46 generates an EQEFM signal based on the inputted EFM signal.

[0068] Drawing 7 is drawing explaining the pit generated by CD-R1 based on an EQEFM signal and an EQEFM signal. As shown in drawing 7 (B), when the EFM encoder 45 generates the EFM signal with which three 1 continues based on the record clock shown in drawing 7 (A), an equalizer 121 outputs an EQEFM signal only with one short period of a record clock.

[0069] An EFM signal is written in and CD-R1 is made to irradiate the strong laser beam which makes a pit form in the optical department 13 in the laser drive circuit 122 of the adaptation processing section 46 based on the EQEFM signal supplied from the equalizer 121.

[0070] Based on the EQEFM signal shown in drawing 7 (C), as the pit formed in CD-R1 is shown in drawing 7 (D), the die length turns into die length corresponding to an EFM signal. When the laser beam to which the optical department 13 irradiates the pit shown in

drawing 7 (D) scans, the RF signal which RF processing section 43 outputs has the signal level corresponding to the die length of a pit, as shown in drawing 7 (E).

[0071] The playback binary-ized wave reproduced from the RF signal shown in drawing 7 (E) becomes equivalent to what reversed the EFM signal, as shown in drawing 7 (F).

[0072] Since the CD-R drive equipment concerning this invention rotates CD-R1 with a predetermined rotational speed which is a constant angular velocity, from the pit truck of a periphery near the rim of CD-R1, linear velocity differs and the pit truck of the inner circumference near the core of CD-R1 differs in the frequency of the record clock based on a Wobble signal.

[0073] Then, as shown in drawing 8 , the EQEFM signals generated from the same EFM signal differ by the case where data are written in the pit truck of the inner circumference near the core of CD-R1, and the case where data are written in the pit truck of the periphery near the rim of CD-R1.

[0074] For example, an EQEFM signal is set to the period (N-1) of a record clock, and 1 when writing data in the pit truck of the inner circumference near the core of CD-R1 based on N period of a record clock, and the EFM signal which is 1, as shown in drawing 8 (A).

[0075] An EQEFM signal is set to the period (N-X) of a record clock, and 1 when writing data in the pit truck of the periphery near the rim of CD-R1 based on N period of a record clock, and the EFM signal which is 1. X is or more 0 one or less one of values, and calls processing of the decision of the value of X a light strategy (Write Strategy).

[0076] As shown in drawing 9 , processing of a light strategy may divide the pit truck nearest to a rim into a predetermined number of M zones (field) from the pit truck nearest to the core of CD-R1, and may determine the value of X beforehand for every zone. The write-in adaptation processing section 46 chooses the value of X memorized beforehand based on the frequency of the record clock supplied from an ATIP decoder / record clock generation section 44, and you may make it generate an EQEFM signal.

[0077] For example, in Z in drawing which is the zone where the pit truck nearest to the core of CD-R1 is included (0), X is set to 1. X is set to 0.96 in Z (1) which is the zone located in the periphery side of Z (0), and X is set to 0.92 in Z (2) which is the zone located in the periphery side of Z (1). For example, in Z in drawing which is the zone where the pit truck nearest to the rim of CD-R1 is included (M), X is set to 0.80 and X is set to 0.86 in Z (M-1) which is the zone located in the inner circumference side of Z (M).

[0078] Moreover, CPU47 chooses the value of X memorized beforehand based on the frequency of the record clock supplied from an ATIP decoder / record clock generation section 44, the write-in adaptation processing section 46 is supplied, and you may make it the write-in adaptation processing section 46 generate an EQEFM signal based on the value of supplied X for example.

[0079] Furthermore, in order to reduce a jitter, you may make it change the output of the laser diode of the optical department 13 when writing data in CD-R1 for every M zones.

[0080] For example, it sets to Z in drawing which is the zone where the pit truck nearest to the core of CD-R1 is included (0). In Z (1) which is the zone which sets the output of the laser diode of the optical department 13 to 9.0mW, and is located in the periphery side of Z (0) The output of a laser diode is set to 9.4mW, and the output of a laser diode is set

to 9.9mW in Z (2) which is the zone located in the periphery side of Z (1). For example, in Z in drawing which is the zone where the pit truck nearest to the rim of CD-R1 is included (M), the output of the laser diode of the optical department 13 is set to 12.0mW, and the output of a laser diode is set to 11.4mW in Z (M-1) which is the zone located in the inner circumference side of Z (M).

[0081] Since the rotational speed of CD-R1 is being fixed, if the location of the optical department 13 to radial [of CD-R1] is acquired from a thread servo, CD-R drive equipment can compute the linear velocity of a pit truck. Based on the location of the optical department 13 to radial [of CD-R1], CD-R drive equipment may perform processing of a light strategy, and may opt for the output of the laser diode of the optical department 13.

[0082] Drawing 10 is drawing explaining the requirements for a configuration of the optical department 13 of CD-R drive equipment. For example, the laser diode of the optical department 13 sets the maximum output to 13 thru/or 14mW, and the objective lens as which a laser beam is completed sets numerical aperture (Numerical Aperture) to 0.5. Moreover, the optical department 13 uses a high-speed detector 71-1 thru/or 71-3 [high-speed], and uses a high-speed photodiode for the monitor of the output of a laser diode. It is building a high-speed current switch in the laser drive circuit 122 etc.

[0083] Next, processing of the writing of CD-R drive equipment is explained with reference to the flow chart of drawing 11 . In step S11, based on the signal supplied from the detector 71-1 of the optical department 13 thru/or 71-3, RF processing section 43 generates a Wobble signal, and outputs it to an ATIP decoder / record clock generation section 44. In step S12, an ATIP decoder / record clock generation section 44 generates the record clock of a predetermined frequency corresponding to the frequency of a Wobble signal based on the Wobble signal supplied from RF processing section 43, and supplies it to it at the EFM encoder 45 and the write-in adaptation processing section 46.

[0084] In step S13, the EFM encoder 45 inputs data through a CD-ROM encoder / decoder ATAPI interface 18. In step S14, the EFM encoder 45 generates the EFM signal corresponding to the inputted data based on a record clock, and outputs it to the write-in adaptation processing section 46. In step S15, based on the record clock supplied from an ATIP decoder / record clock generation section 44, the write-in adaptation processing section 46 performs processing of a light strategy, and generates an EQEFM signal from an EFM signal.

[0085] In step S16, the write-in adaptation processing section 46 sets up the write-in optical output of the laser diode of the optical department 13 based on the record clock supplied from an ATIP decoder / record clock generation section 44. In step S17, the optical department 13 performs the writing of the data to CD-R1 based on the EQEFM signal supplied write-in adaptation processing section 46.

[0086] As mentioned above, the CD-R drive equipment concerning this invention can rotate CD-R1 with a predetermined rotational speed which is a constant angular velocity, and can write data in CD-R1. Since CD-R drive equipment writes in data, without changing the rotational speed of CD-R1, the time amount of it which waits for change of the rate of rotation of CD-R1 by the constant linear velocity as compared with the case where data are written in is lost, and it can write in data quickly.

[0087] Moreover, since a spindle motor 41 rotates at a fixed rate, the CAV controller 42 can consist of simple circuits as compared with the ATIP decoder 16 of conventional CD-R drive equipment. Since the output of a spindle motor 41 can also be lessened, the calorific value of a spindle motor 41 also decreases, and power consumption can also be lessened.
[0088] Although explained above as CD-R drive equipment, CD-RW (Compact Disc-ReWritable) drive equipment may be used.
[0089] Although a series of processings mentioned above can also be performed by hardware, they can also be performed with software. When performing a series of processings with software, the program which constitutes the software is installed in a general-purpose personal computer etc. from a record medium possible [performing various kinds of functions] by installing the computer built into the hardware of dedication, or various kinds of programs.
[0090] As shown in drawing 12 , this record medium is distributed apart from a computer in order to provide a user with a program. The magnetic disk 351 (a floppy disk is included) with which the program is recorded, an optical disk 352 (CD-ROM (Compact Disc-Read Only Memory) ---) DVD (Digital Versatile Disc) is included. It is not only constituted by the package media which consist of a magneto-optic disk 353 (MD (Mini-Disc) is included) or semiconductor memory 354, but It consists of ROM302 with which a user is provided in the condition of having been beforehand included in the computer and on which the program is recorded, a hard disk contained in the storage section 308.
[0091] In addition, in this specification, even if the processing serially performed in accordance with the sequence that the step which describes the program stored in a record medium was indicated is not of course necessarily processed serially, it is a juxtaposition thing also including the processing performed according to an individual.
[0092] Moreover, in this specification, a system expresses the whole equipment constituted by two or more equipments.
[0093]
[Effect of the Invention] Since according to the disk driving gear according to claim 1, the disk drive approach according to claim 5, and the record medium according to claim 6 the linear-velocity signal corresponding to the linear velocity of the truck with which the data of the information record medium with which it is equipped are recorded is generated, the clock corresponding to a linear-velocity signal is generated and data were recorded on the information record medium based on the clock, it comes to be able to do record quickly.

[Translation done.]

TECHNICAL FIELD

[Field of the Invention] This invention relates to a record medium at the disk driving gear which can do record for a disk driving gear and an approach, and a list quickly especially about a record medium and an approach, and a list.

[Translation done.]

PRIOR ART

[Description of the Prior Art] CD-R (Compact Disc-Recordable) drive equipment records predetermined data on CD-R with which it was equipped, or reproduces predetermined data from CD-R. At this time, CD-R drive equipment applies a spindle servo so that CD-R may be rotated with the rotational speed which becomes fixed [the linear velocity of a predetermined pit truck]. Moreover, a tracking servo, a focus servo, and a thread servo are applied so that the laser spot of the laser beam which the laser diode built in an optical pickup generates may follow the predetermined pit truck of CD-R and can record or reproduce data.
[0003] The configuration of conventional CD-R drive equipment is explained with reference to the block diagram shown in drawing 1 . The spindle rotated with a spindle motor 11 with the rotational speed which becomes fixed [the linear velocity of a predetermined pit truck] is equipped with CD-R1. The spindle driver 12 drives a spindle motor 11 so that it may become the rotational speed [be / fixed] based on the CLV (Constant Linear Velocity) signal supplied from the ATIP decoder 16 about the linear velocity of a predetermined pit truck.
[0004] The optical department 13 irradiates light from the laser diode (not shown) to build in in the signal side of CD-R1. The existence and the guide rail (it is also called PURIGURUBU or the guide groove) of a signal (pit) become irregular, and the light reflected from the signal side of CD-R1 is received with the detector of the optical department 13. The detector of the optical department 13 changes the light from CD-R1

into an electrical signal, and outputs it to RF (Radio Frequency) processing section 15.
[0005] The optical department 13 changes the output of a laser diode again based on the data which were supplied from the write-in adaptation processing section 21 and by which the EQFEM modulation was carried out, when writing data in CD-R1. The optical department 13 is driven to radial [of CD-R1] by the thread motor which is not illustrated.
[0006] The APC (Auto Power Control) section 14 adjusts the output of the laser diode of the optical department 13 based on control of CPU (Central Processing Unit)19.
[0007] From the signal detected with the detector, RF processing section 15 generates the regenerative signal (a RF signal is called hereafter) corresponding to a pit, and outputs it to the EFM (Eight to Fourteen Modulation) decoder 17. From the signal detected with the detector, RF processing section 15 generates the Wobble signal corresponding to a guide rail, and outputs it to the ATIP decoder 16. Since the linear velocity of a pit truck is fixed, a Wobble signal has a 22.05kHz**1kHz frequency, while recording data on CD-R1, or when having read data in CD-R1.
[0008] Moreover, the frequency modulation of the Wobble signal is carried out, and since the linear velocity of a pit truck is fixed, the clock frequency of the signal which restored to it has the fixed frequency of 6.30kHz, while recording data on CD-R1, or when having read data in CD-R1.
[0009] RF processing section 15 performs addition-and-subtraction processing of the signal detected with the detector again, generates a tracking error signal (TE (Tracking Error) signal is called hereafter) and a focal error signal (FE (Focus Error) signal is called hereafter), and outputs them to the servo driver which controls a tracking servo, a focus servo, and a thread servo and which is not illustrated.
[0010] The ATIP decoder 16 outputs the data in which rotation of a spindle is shown to a CD-ROM (Compact Disc-Read Only Memory) encoder / decoder ATAPI (AT Attachment Packet Interface) interface 18 while the optical department 13 generates the CLV signal which shows the linear velocity of the pit truck which is irradiating light and supplies it to the spindle driver 12 based on the Wobble signal supplied from RF processing section 15.
[0011] The EFM decoder 17 carries out the EFM recovery of the RF signal generated in RF processing section 15, changes it into the format for CD-ROM, and is outputted to a CD-ROM encoder / decoder ATAPI interface 18.
[0012] A CD-ROM encoder / decoder ATAPI interface 18 supplies the data supplied from the external device to the EFM encoder 20 while outputting the data supplied from the ATIP decoder 16 or the EFM decoder 17 through an ATAPI interface to the radical of control of CPU19 at an external device.
[0013] CPU19 controls a CD-ROM encoder / decoder ATAPI interface 18, the write-in adaptation processing section 21, and the APC section 14 based on the data inputted from the CD-ROM encoder / decoder ATAPI interface 18.
[0014] The EFM encoder 20 generates the EFM signal corresponding to the data inputted from the CD-ROM encoder / decoder ATAPI interface 18, and outputs it to the write-in adaptation processing section 21 with the record clock of the frequency of immobilization.
[0015] Based on the EFM signal and record clock which were supplied from the EFM encoder 20, the write-in adaptation processing section 21 generates an EQEFM (Equalized EFM) signal, and supplies it to the optical department 13.

[0016] Thus, conventional CD-R drive equipment applies a spindle servo so that data may be rotated with the rotational speed from which the linear velocity of the pit truck which is carrying out record or read-out becomes fixed.

EFFECT OF THE INVENTION

[Effect of the Invention] Since according to the disk driving gear according to claim 1, the disk drive approach according to claim 5, and the record medium according to claim 6 the linear-velocity signal corresponding to the linear velocity of the truck with which the data of the information record medium with which it is equipped are recorded is generated, the clock corresponding to a linear-velocity signal is generated and data were recorded on the information record medium based on the clock, it comes to be able to do record quickly.

[Translation done.]

* NOTICES *
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damages caused by the use of this translation.
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, conventional CD-R drive equipment must wait for the engine speed of CD-R1 to change, and requires time amount for record of the data to CD-R1 until the linear velocity of a pit truck to record becomes fixed.
[0018] This invention is made in view of such a situation, and it aims at being made to be

possible [record] quickly.

[Translation done.]

MEANS

[Means for Solving the Problem] A disk driving gear according to claim 1 is characterized by including a linear-velocity signal generation means to generate the linear-velocity signal corresponding to the linear velocity of the truck with which the data of the information record medium with which it is equipped are recorded, a clock generation means to generate the clock corresponding to a linear-velocity signal, and a record means to record data on an information record medium based on a clock.
[0020] A linear-velocity signal is generable from a Wobble signal.
[0021] A record means can establish further a driving signal amendment means to amend the driving signal which drives an optical generating means, based on a clock including the optical generating means which emits the light which records data to an information record medium.
[0022] A disk driving gear can prepare further the adjustment device which adjusts the reinforcement of the laser beam which records data to the information record medium of a record means based on a clock.
[0023] The disk drive approach according to claim 5 is characterized by including the linear-velocity signal generation step which generates the linear-velocity signal corresponding to the linear velocity of the truck with which the data of the information record medium with which it is equipped are recorded, the clock generation step which generates the clock corresponding to a linear-velocity signal, and the record step which records data on an information record medium based on a clock.
[0024] A record medium according to claim 6 is characterized by to be recorded the program which the computer which performs processing containing the linear-velocity signal generation step which generates the linear-velocity signal corresponding to the linear velocity of the truck with which the data of the information record medium with which it is equipped are recorded, the clock-generation step which generate the clock corresponding to a linear-velocity signal, and the record control step which control record of the data to an information record medium based on a clock can read.
[0025] In a disk driving gear according to claim 1, the disk drive approach according to

claim 5, and a record medium according to claim 6, the linear-velocity signal corresponding to the linear velocity of the truck with which the data of the information record medium with which it is equipped are recorded is generated, the clock corresponding to a linear-velocity signal is generated, and data are recorded on an information record medium based on a clock.

[0026]

[Embodiment of the Invention] Drawing 2 is the block diagram showing the configuration of the gestalt of 1 operation of the CD-R drive equipment concerning this invention. The same sign is given to the conventional case and the corresponding part, and the explanation is omitted suitably. A spindle motor 41 rotates a spindle with a predetermined rotational speed which is a constant angular velocity. CD-R1 with which the spindle is equipped rotates with a predetermined rotational speed which is a constant angular velocity. A spindle motor 41 outputs the electrical potential difference proportional to the rotational speed of a spindle to the CAV (Constant Angular Velocity) controller 42 as a FG (Frequency Generator) signal.

[0027] Based on FG signal supplied from the spindle motor 41, the CAV controller 42 controls the spindle driver 12 so that a spindle motor 41 rotates with a predetermined rotational speed which is a constant angular velocity.

[0028] From the signal detected with the detector, RF processing section 43 generates the Wobble signal corresponding to a guide rail, and outputs it to an ATIP decoder / record clock generation section 44 while it generates RF ** corresponding to a pit and outputs it to the EFM decoder 17 from the signal detected with the detector. The frequency and a recovery frequency change with the locations of the pit truck with which it recorded or read and the optical department 13 is carrying out the Wobble signal which RF processing section 43 of the CD-R drive equipment concerning this invention outputs to an ATIP decoder / record clock generation section 44 since the angular velocity of CD-R1 is fixed.

[0029] An ATIP decoder / record clock generation section 44 outputs the data in which rotation of a spindle is shown to a CD-ROM encoder / decoder ATAPI interface 18 while it generates the record clock of the predetermined frequency corresponding to the frequency and recovery frequency of a Wobble signal based on the Wobble signal supplied from RF processing section 43 and supplies it to the EFM encoder 45, the write-in adaptation processing section 46, and CPU47.

[0030] From the data inputted from the CD-ROM encoder / decoder ATAPI interface 18, the EFM encoder 45 generates an EFM signal based on the record clock supplied from an ATIP decoder / record clock generation section 44, and outputs it to it at the write-in adaptation processing section 46.

[0031] Based on the EFM signal supplied from the EFM encoder 45, and the record clock supplied from an ATIP decoder / record clock generation section 44, the write-in adaptation processing section 46 generates an EQEFM signal, and supplies it to the optical department 13. The write-in adaptation processing section 46 controls the reinforcement of the laser beam to which the optical department 13 irradiates CD-R1 based on the data supplied from CPU47.

[0032] CPU47 generates data for the write-in adaptation processing section 46 to control

the reinforcement of the laser beam of the optical department 13 based on the frequency of the record clock supplied from an ATIP decoder / record clock generation section 44, and outputs them to the write-in adaptation processing section 46.

[0033] When recording data on CD-R1, the optical department 13 changes the reinforcement of a laser beam based on the EQEFM signal supplied from the write-in adaptation processing section 46.

[0034] Drawing 3 is drawing showing the configuration of the detector of the optical department 13, and RF signal-processing section 43. The optical department 13 irradiates the laser beam by which outgoing radiation was carried out from the laser diode to build in in the signal side of CD-R1. One laser beam irradiated is divided into one laser beam for signal reading (record), and two laser beams for tracking servos by the grating (diffraction grating) which is not illustrated at this time. That is, one laser beam is divided into three laser beams by the grating. And three laser beams from the reflector acquired by irradiating three laser beams in the signal side of CD-R1 are received by the detector 71-1 thru/or 71-3, respectively.

[0035] After the quadrisected sensors A and D detect a detector 71-1 and it carries out ******** conversion at electrical signals AP, BP, CP, and DP, it outputs the laser beam for signal reading reflected from CD-R1 to amplifier 72-1 thru/or 72-4. Amplifier 72-1 thru/or 72-4 amplify Signals AP and DP, respectively, and outputs them to an adder 73.

[0036] An adder 73 is adding the signals AP, BP, CP, and DP amplified by amplifier 72-1 thru/or 72-4 according to a degree type (1), generates a RF signal and outputs it to the EFM decoder 17.

[0037]

RF= (AP+BP+CP+DP) ... (1)

Amplifier 72-1 thru/or 72-4 output Signals AP, BP, CP, and DP to the Maine sample hold circuit 74 again, respectively.

[0038] The Maine sample hold circuit 74 outputs those signals to amplifier 75 while carrying out sample hold of the signals AP, BP, CP, and DP until the activity of predetermined A/D (Analog To Digital) conversion ends. Before it carries out sample hold of the signals AP, BP, CP, and DP, outputs them and writes data in CD-R1, or after writing in the Maine sample hold circuit 74 while writing data in CD-R1, only a sample performs Signals AP, BP, CP, and DP (** which is not held), and it outputs them to amplifier 75.

[0039] Amplifier 75 outputs the signal which added the inputted signals BP and CP, and added and generated them to AGC circuit 77 while outputting the signal which added the inputted signals AP and DP, and added and generated them to the AGC (Automatic Gain Control) circuit 76.

[0040] Amplifier 75 calculates the inputted signals AP, BP, CP, and DP again according to a degree type (2), and generates FE signal.

[0041]

FE=(AP+CP)-(BP+DP) ... (2)

Further, from the inputted signals AP, BP, CP, and DP, according to a degree type (3), amplifier 75 calculates an MPP (Main Push Pull) signal, and outputs it to a switch 79 and + input terminal of the differential amplifier 85.

[0042]

MPP=(AP+DP)-(BP+CP) ... (3)

AGC circuit 76 adjusts the amplitude so that the level of the signal adding the inputted signals AP and DP may be set to the same level as reference level as compared with predetermined reference level, and it outputs it to + input terminal of the differential amplifier 78.

[0043] AGC circuit 77 adjusts the amplitude so that the level of the signal adding the inputted signals BP and CP may be set to the same level as reference level as compared with predetermined reference level, and it outputs it to - input terminal of the differential amplifier 78.

[0044] The differential amplifier 78 computes the difference of the signal adding the signals AP and DP with which the amplitude was adjusted, and the signal adding the signals BP and CP with which the amplitude was adjusted, and supplies it to a switch 79.

[0045] A switch 79 outputs the signal supplied from the differential amplifier 85 to a band pass filter 80, after outputting and writing the MPP signal supplied from the amplifier 75 in a band pass filter 80 before writing it in while writing data in CD-R1 based on the signal supplied from the optical department 13 or. From the signal supplied from the switch 79, a band pass filter 80 removes the component below a predetermined frequency, and the component more than a frequency predetermined [other], and outputs them to an ATIP decoder / record clock generation section 44 as a Wobble signal.

[0046] After the sensors E and F divided into two detect the 1st laser beam for tracking servos reflected from CD-R1 and a detector 71-2 changes it into electrical signals EP and FP, respectively, it is inputted into amplifier 81-1 and 81-2. Amplifier 81-1 and 81-2 amplify Signals EP and FP, respectively, and output them to the side sample hold circuit 83. After the sensors G and H divided into two detect the 2nd laser beam for tracking servos reflected from CD-R1 and a detector 71-3 changes it into electrical signals GP and HP, respectively, it is outputted to amplifier 82-1 and 82-2. Amplifier 82-1 and 82-2 amplify Signals GP and HP, respectively, and output them to the side sample hold circuit 83.

[0047] The side sample hold circuit 83 inputs those signals into amplifier 84 while carrying out sample hold of the signals EP and FP for the 1st tracking servo, and the signals GP and HP for the 2nd tracking servo, respectively until the activity of A/D conversion ends. Before it carries out sample hold of the signals EP and FP for the 1st tracking servo and the signal GP for the 2nd tracking servo, and the HP **, outputs them and writes data in CD-R1, or after writing in the side sample hold circuit 83 while writing data in CD-R1, only a sample performs the signals EP and FP for the 1st tracking servo, and the signals GP and HP for the 2nd tracking servo, and it outputs them to amplifier 84.

[0048] From the inputted signals EP, FP, GP, and HP, according to a degree type (4), amplifier 84 calculates a SPP (Side Push Pull) signal, and outputs it to - input terminal of the differential amplifier 85.

[0049]

SPP=(FP+HP)-(EP+GP) ... (4)

The differential amplifier 85 calculates TE signal from the inputted MPP signal and a SPP signal according to a degree type (5).

[0050]

TE=MPP-SPP ... (5)

Next, the CD-R drive equipment concerning this invention explains to CD-R1 the actuation which writes in data with reference to the block diagram of drawing 4 based on the data supplied from the Wobble signal and the CD-ROM encoder / decoder ATAPI interface 18.

[0051] From the MPP signal generated with a detector 71-1, amplifier 72-1 or 72-4, the Maine sample hold circuit 74, and amplifier 75, a band pass filter 80 extracts only a predetermined frequency component, and outputs it to an ATIP decoder / record clock generation section 44 as a Wobble signal.

[0052] As CD-R1 is shown in drawing 5 and drawing 6 , PURIGURUBU (guide rail) is beforehand prepared in the transparency layer (it is also called a substrate) formed by the polycarbonate. When writing data in CD-R1 as compared with the time of reading data, CD-R drive equipment irradiates a strong laser beam along with PURIGURUBU, disassembles the organic coloring matter of a recording layer, and makes a pit form in CD-R1 by making a transparency layer deform. PURIGURUBU of CD-R1 has a number of wobbles (wave) defined beforehand to the predetermined die length of PURIGURUBU, as shown in drawing 6 . Therefore, the laser beam reflected from PURIGURUBU has vibration of the period corresponding to the wobble of PURIGURUBU.

[0053] The signal corresponding to vibration of the period corresponding to the wobble of PURIGURUBU is extracted as a Wobble signal. namely, the passing speed [as opposed to PURIGURUBU in the period of a Wobble signal] of a laser beam irradiated by PURIGURUBU -- in other words, the linear velocity of a pit truck is supported.

[0054] Moreover, the frequency modulation of the Wobble signal is carried out, and the phase of the clock signal which synchronized with the signal which restored to it synchronizes with the phase of the record clock at the time of recording data on a pit truck.

[0055] As compared with the predetermined threshold which was able to be defined beforehand, the supplied Wobble signal is made binary and the binary-ized circuit 101 of an ATIP decoder / record clock generation section 44 outputs it to the frequency comparator circuit 102. The frequency comparator circuit 102 compares the Wobble signal which was supplied from the binary-ized circuit 101 and which was made binary with the signal supplied from the frequency divider 105, and outputs the signal of the electrical potential difference corresponding to the delta frequency of a Wobble signal and the signal supplied from the frequency divider 105 to a low pass filter 103.

[0056] From the signal supplied from the frequency comparator circuit 102, a low pass filter 103 removes the component more than a predetermined frequency, and supplies the signal to VCO (Voltage Controlled Oscillator)104. VCO104 generates the signal of the frequency corresponding to the electrical potential difference after addition of the signal supplied from the low pass filter 103 and the low pass filter 111, and outputs it to a frequency divider 105, a frequency divider 112, and the EFM encoder 45.

[0057] A frequency divider 105 carries out dividing of the signal supplied from VCO104 to 1/196 (for example, if the signal supplied from VCO104 is 4.3218MHz, set to 22.05kHz), and outputs it to the frequency comparator circuit 102.

[0058] A phase comparator 106 compares the phase of the Wobble signal which was supplied from the binary-ized circuit 101 and which was made binary, and the signal supplied from VCO108, and outputs the signal of the electrical potential difference corresponding to the phase contrast to a low pass filter 107.
[0059] From the signal supplied from the phase comparator 106, a low pass filter 107 removes the component more than a predetermined frequency, and supplies the signal to VCO108. Moreover, the output of a low pass filter 107 is supplied also to the binary-ized circuit 109, and the signal made binary is outputted to a phase comparator 110.
[0060] A phase comparator 110 compares the phase of the FMDT signal which was supplied from the binary-ized circuit 109 and which was made binary, and the signal supplied from the frequency divider 112, and outputs the signal of the electrical potential difference corresponding to the phase contrast to a low pass filter 111.
[0061] After a low pass filter 111 removes the component more than a predetermined frequency and adds the signal with the output of a low pass filter 103 from the signal supplied from the phase comparator 110, it is supplied to VCO104.
[0062] A frequency divider 112 carries out dividing of the signal supplied from VCO104 to 1/686, and outputs it to a phase comparator 110.
[0063] It is 196 times the frequency of a Wobble signal, and the clock frequency and phase of a FMDT signal synchronize, and the signal outputted to the EFM encoder 45 serves as a record clock which is 686 times the clock frequency of a FMDT signal from an ATIP decoder / record clock generation section 44.
[0064] When the frequency of a Wobble signal changes, an ATIP decoder / record clock generation section 44 follows the change, the frequency of section is as mentioned above first, and it acts so that a phase may next synchronize with the clock of a FMDT signal, and generates a record clock.
[0065] In addition, what is necessary is just to make 1/98 and the rate of dividing of a frequency divider 112 into 1/343 for the rate of dividing of a frequency divider 105, when a twice as many record clock as this is required.
[0066] The EFM encoder 45 divides into 8-bit data the data supplied from the CD-ROM encoder / decoder ATAPI interface 18, and transposes each to 14-bit predetermined data (0 which the replaced data follow becomes less than [2 / 10 or more] (only one zero is not inserted between one and continuous 11 or more 0 does not appear)). The EFM encoder 45 generates the signal reversed when 1 appears in the replaced 14-bit data, i.e., an EFM signal, based on the record clock supplied from an ATIP decoder / record clock generation section 44.
[0067] The EFM encoder 45 writes in an EFM signal and outputs it to the adaptation processing section 46. The equalizer 121 of the write-in adaptation processing section 46 generates an EQEFM signal based on the inputted EFM signal.
[0068] Drawing 7 is drawing explaining the pit generated by CD-R1 based on an EQEFM signal and an EQEFM signal. As shown in drawing 7 (B), when the EFM encoder 45 generates the EFM signal with which three 1 continues based on the record clock shown in drawing 7 (A), an equalizer 121 outputs an EQEFM signal only with one short period of a record clock.
[0069] An EFM signal is written in and CD-R1 is made to irradiate the strong laser beam

which makes a pit form in the optical department 13 in the laser drive circuit 122 of the adaptation processing section 46 based on the EQEFM signal supplied from the equalizer 121.

[0070] Based on the EQEFM signal shown in drawing 7 (C), as the pit formed in CD-R1 is shown in drawing 7 (D), the die length turns into die length corresponding to an EFM signal. When the laser beam to which the optical department 13 irradiates the pit shown in drawing 7 (D) scans, the RF signal which RF processing section 43 outputs has the signal level corresponding to the die length of a pit, as shown in drawing 7 (E).

[0071] The playback binary-ized wave reproduced from the RF signal shown in drawing 7 (E) becomes equivalent to what reversed the EFM signal, as shown in drawing 7 (F).

[0072] Since the CD-R drive equipment concerning this invention rotates CD-R1 with a predetermined rotational speed which is a constant angular velocity, from the pit truck of a periphery near the rim of CD-R1, linear velocity differs and the pit truck of the inner circumference near the core of CD-R1 differs in the frequency of the record clock based on a Wobble signal.

[0073] Then, as shown in drawing 8 , the EQEFM signals generated from the same EFM signal differ by the case where data are written in the pit truck of the inner circumference near the core of CD-R1, and the case where data are written in the pit truck of the periphery near the rim of CD-R1.

[0074] For example, an EQEFM signal is set to the period (N-1) of a record clock, and 1 when writing data in the pit truck of the inner circumference near the core of CD-R1 based on N period of a record clock, and the EFM signal which is 1, as shown in drawing 8 (A).

[0075] An EQEFM signal is set to the period (N-X) of a record clock, and 1 when writing data in the pit truck of the periphery near the rim of CD-R1 based on N period of a record clock, and the EFM signal which is 1. X is or more 0 one or less one of values, and calls processing of the decision of the value of X a light strategy (Write Strategy).

[0076] As shown in drawing 9 , processing of a light strategy may divide the pit truck nearest to a rim into a predetermined number of M zones (field) from the pit truck nearest to the core of CD-R1, and may determine the value of X beforehand for every zone. The write-in adaptation processing section 46 chooses the value of X memorized beforehand based on the frequency of the record clock supplied from an ATIP decoder / record clock generation section 44, and you may make it generate an EQEFM signal.

[0077] For example, in Z in drawing which is the zone where the pit truck nearest to the core of CD-R1 is included (0), X is set to 1, X is set to 0.96 in Z (1) which is the zone located in the periphery side of Z (0), and X is set to 0.92 in Z (2) which is the zone located in the periphery side of Z (1). For example, in Z in drawing which is the zone where the pit truck nearest to the rim of CD-R1 is included (M), X is set to 0.80 and X is set to 0.86 in Z (M-1) which is the zone located in the inner circumference side of Z (M).

[0078] Moreover, CPU47 chooses the value of X memorized beforehand based on the frequency of the record clock supplied from an ATIP decoder / record clock generation section 44, the write-in adaptation processing section 46 is supplied, and you may make it the write-in adaptation processing section 46 generate an EQEFM signal based on the value of supplied X for example.

[0079] Furthermore, in order to reduce a jitter, you may make it change the output of the laser diode of the optical department 13 when writing data in CD-R1 for every M zones.
[0080] For example, it sets to Z in drawing which is the zone where the pit truck nearest to the core of CD-R1 is included (0). In Z (1) which is the zone which sets the output of the laser diode of the optical department 13 to 9.0mW, and is located in the periphery side of Z (0) The output of a laser diode is set to 9.4mW, and the output of a laser diode is set to 9.9mW in Z (2) which is the zone located in the periphery side of Z (1). For example, in Z in drawing which is the zone where the pit truck nearest to the rim of CD-R1 is included (M), the output of the laser diode of the optical department 13 is set to 12.0mW, and the output of a laser diode is set to 11.4mW in Z (M-1) which is the zone located in the inner circumference side of Z (M).
[0081] Since the rotational speed of CD-R1 is being fixed, if the location of the optical department 13 to radial [of CD-R1] is acquired from a thread servo, CD-R drive equipment can compute the linear velocity of a pit truck. Based on the location of the optical department 13 to radial [of CD-R1], CD-R drive equipment may perform processing of a light strategy, and may opt for the output of the laser diode of the optical department 13.
[0082] Drawing 10 is drawing explaining the requirements for a configuration of the optical department 13 of CD-R drive equipment. For example, the laser diode of the optical department 13 sets the maximum output to 13 thru/or 14mW, and the objective lens as which a laser beam is completed sets numerical aperture (Numerical Aperture) to 0.5. Moreover, the optical department 13 uses a high-speed detector 71-1 thru/or 71-3 [high-speed], and uses a high-speed photodiode for the monitor of the output of a laser diode. It is building a high-speed current switch in the laser drive circuit 122 etc.
[0083] Next, processing of the writing of CD-R drive equipment is explained with reference to the flow chart of drawing 11 . In step S11, based on the signal supplied from the detector 71-1 of the optical department 13 thru/or 71-3, RF processing section 43 generates a Wobble signal, and outputs it to an ATIP decoder / record clock generation section 44. In step S12, an ATIP decoder / record clock generation section 44 generates the record clock of a predetermined frequency corresponding to the frequency of a Wobble signal based on the Wobble signal supplied from RF processing section 43, and supplies it to it at the EFM encoder 45 and the write-in adaptation processing section 46.
[0084] In step S13, the EFM encoder 45 inputs data through a CD-ROM encoder / decoder ATAPI interface 18. In step S14, the EFM encoder 45 generates the EFM signal corresponding to the inputted data based on a record clock, and outputs it to the write-in adaptation processing section 46. In step S15, based on the record clock supplied from an ATIP decoder / record clock generation section 44, the write-in adaptation processing section 46 performs processing of a light strategy, and generates an EQEFM signal from an EFM signal.
[0085] In step S16, the write-in adaptation processing section 46 sets up the write-in optical output of the laser diode of the optical department 13 based on the record clock supplied from an ATIP decoder / record clock generation section 44. In step S17, the optical department 13 performs the writing of the data to CD-R1 based on the EQEFM signal supplied write-in adaptation processing section 46.

[0086] As mentioned above, the CD-R drive equipment concerning this invention can rotate CD-R1 with a predetermined rotational speed which is a constant angular velocity, and can write data in CD-R1. Since CD-R drive equipment writes in data, without changing the rotational speed of CD-R1, the time amount of it which waits for change of the rate of rotation of CD-R1 by the constant linear velocity as compared with the case where data are written in is lost, and it can write in data quickly.
[0087] Moreover, since a spindle motor 41 rotates at a fixed rate, the CAV controller 42 can consist of simple circuits as compared with the ATIP decoder 16 of conventional CD-R drive equipment. Since the output of a spindle motor 41 can also be lessened, the calorific value of a spindle motor 41 also decreases, and power consumption can also be lessened.
[0088] Although explained above as CD-R drive equipment, CD-RW (Compact Disc-ReWritable) drive equipment may be used.
[0089] Although a series of processings mentioned above can also be performed by hardware, they can also be performed with software. When performing a series of processings with software, the program which constitutes the software is installed in a general-purpose personal computer etc. from a record medium possible [performing various kinds of functions] by installing the computer built into the hardware of dedication, or various kinds of programs.
[0090] As shown in drawing 12 , this record medium is distributed apart from a computer in order to provide a user with a program. The magnetic disk 351 (a floppy disk is included) with which the program is recorded, an optical disk 352 (CD-ROM (Compact Disc-Read Only Memory) ---) DVD (Digital Versatile Disc) is included. It is not only constituted by the package media which consist of a magneto-optic disk 353 (MD (Mini-Disc) is included) or semiconductor memory 354, but It consists of ROM302 with which a user is provided in the condition of having been beforehand included in the computer and on which the program is recorded, a hard disk contained in the storage section 308.
[0091] In addition, in this specification, even if the processing serially performed in accordance with the sequence that the step which describes the program stored in a record medium was indicated is not of course necessarily processed serially, it is a juxtaposition thing also including the processing performed according to an individual.
[0092] Moreover, in this specification, a system expresses the whole equipment constituted by two or more equipments.

[Translation done.]

2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

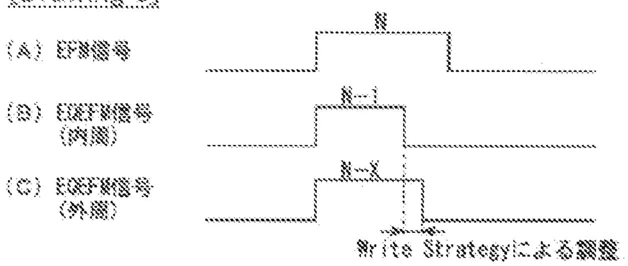
DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is drawing explaining the configuration of conventional CD-R drive equipment.
[Drawing 2] It is the block diagram showing the configuration of the gestalt of 1 operation of the CD-R drive equipment concerning this invention.
[Drawing 3] It is drawing showing the configuration of the detector of the optical department 13, and RF signal-processing section 43.
[Drawing 4] It is a block diagram explaining the actuation which writes in the data of the CD-R drive equipment concerning this invention.
[Drawing 5] It is drawing explaining the structure of CD-R1.
[Drawing 6] It is drawing explaining the structure of CD-R1.
[Drawing 7] It is drawing explaining the pit generated by CD-R1 based on an EQEFM signal and an EQEFM signal.
[Drawing 8] It is drawing explaining a light strategy.
[Drawing 9] It is drawing explaining adjustment of the light strategy for every zone, and the output of a laser diode.
[Drawing 10] It is drawing explaining the requirements for a configuration of the optical department 13 of CD-R drive equipment.
[Drawing 11] It is a flow chart explaining processing of the writing of CD-R drive equipment.
[Drawing 12] It is drawing explaining a record medium.
[Description of Notations]
41 Spindle Motor 42 CAV Controller 43 RF Processing Section, 44 ATIP Decoder / Record Clock Generation Section 45 EFM Encoder 46 Write-in Adaptation Processing Section 47 CPU, 101 Binary-ized circuit 102 A frequency comparator circuit, 103 Low pass filter 104 VCO 105 Frequency divider 106 At least is a phase comparator circuit. 107 A low pass filter, 108 VCO 109 A binary-ized circuit, 110 Phase comparator circuit 111 Low pass filter 112 Frequency divider 121 Equalizer 122 Laser drive circuit 301 CPU 302 ROM 303 RAM, 308 Storage section 351 A magnetic disk and 352 Optical disk 353 Magneto-optic disk 354 Semiconductor memory

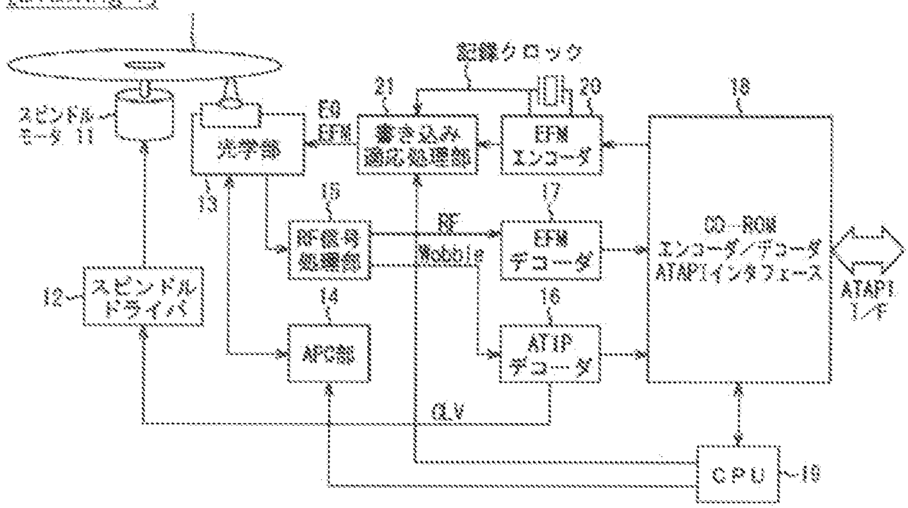
[Translation done.]

DRAWINGS

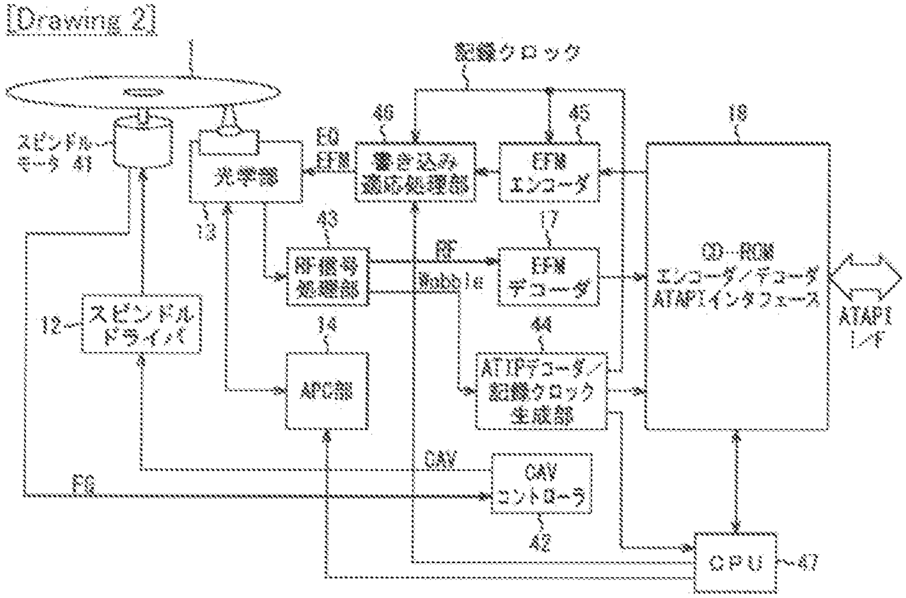
[Drawing 8]



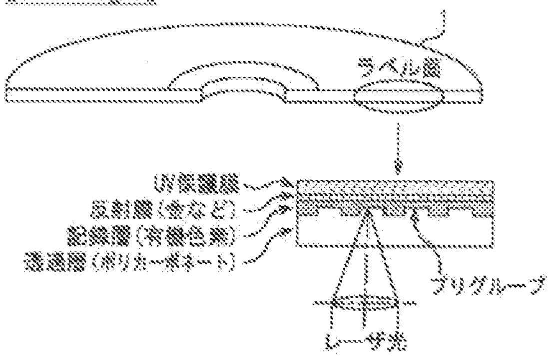
[Drawing 1]



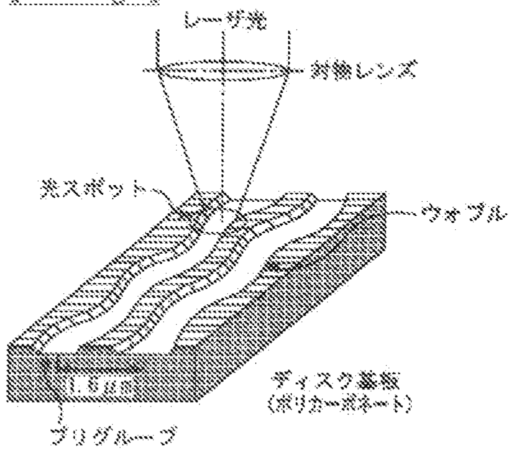
[Drawing 2]



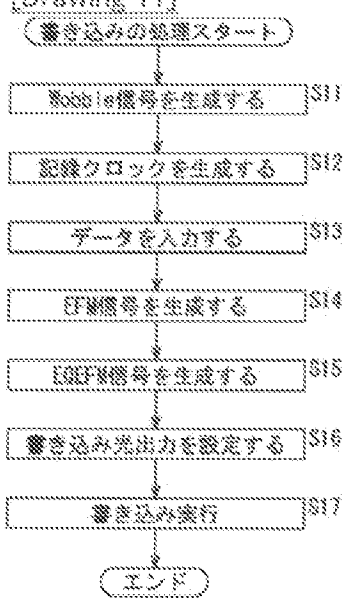
[Drawing 5]



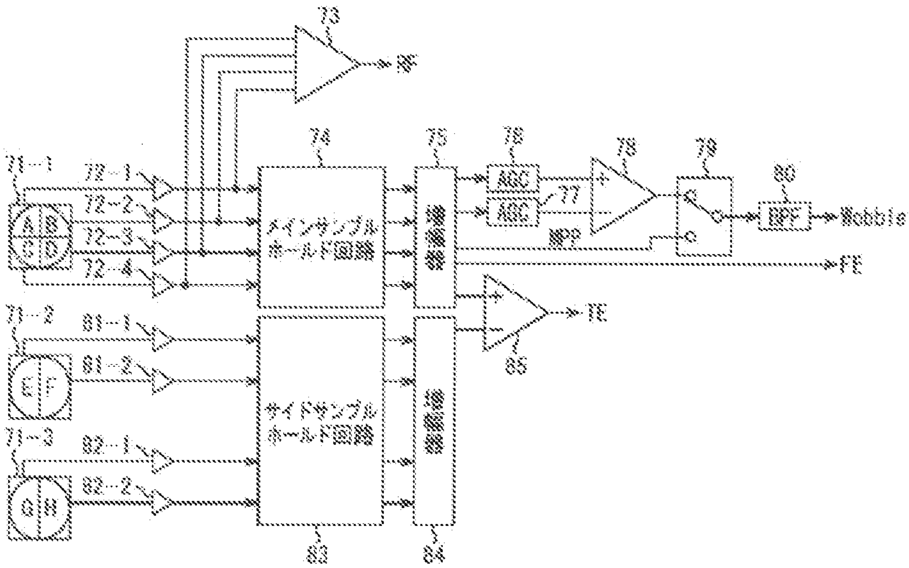
[Drawing 6]



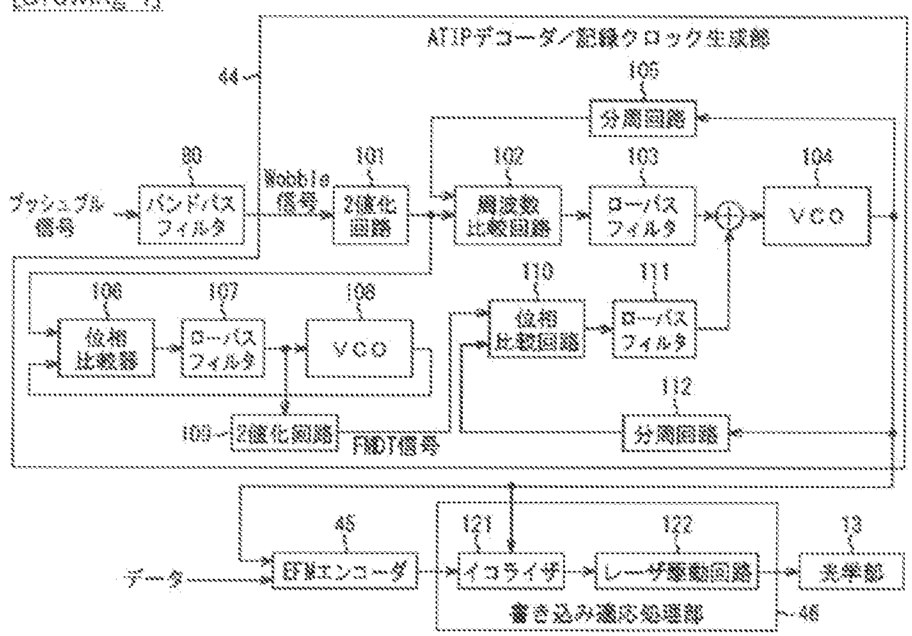
[Drawing 11]



[Drawing 3]



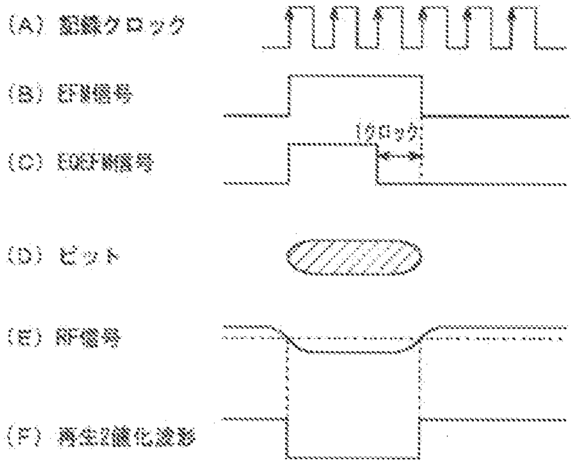
[Drawing 4]



[Drawing 9]

ゾーン	Z0	Z1	Z2	···	Z(M-1)	Z(M)
アドレス (MSF)	00:02:00~04:59:74	05:00:00~09:59:74	10:00:00~14:59:74	···	65:00:00~69:59:74	70:00:00~74:59:74
記録クロック (MHz)	4.3218~4.9688	4.9688~5.3587	5.3587~5.8266	···	9.2023~9.7037	9.7037~10.0378
書き込み電力 (mW)	8.0	8.4	8.8	···	11.4	12.0
ライト・ストラテジィ	N-1	N-0.96	N-0.92	···	N-0.86	N-0.80

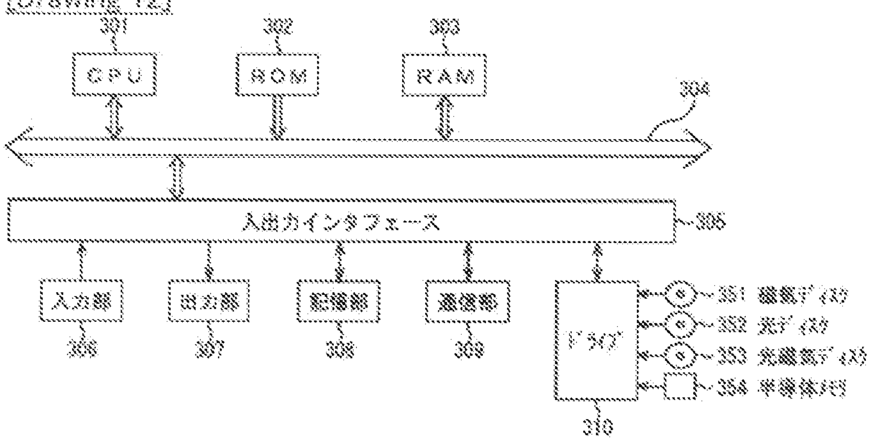
[Drawing 7]



[Drawing 10]

項目	説明	理由
・ハイパワーレーザ搭載	対物レンズ出射最大13～14mW（ただし高速記録時）	各種CD-Rディスク（1.2m/s、1.4m/s）の高速記録に対応する。
・高NA対物レンズ	NA=0.5	記録後のディスクの高品質を（低ジッタ化）のために、ビーム形状を絞る。
・DPP方式によるトラッキングエラー検出	TE=MPP-SPP (A+D)-(B+C)-{(F+H)-(E+G)}	内周側トラックの影響があるため、記録中のサーボ信号生成には1ビームPush-pull法もしくはDPP法しか選択肢がない。
・高速セトリング8分割PDIC内蔵	Read Sampling方式DPPサーボに対応 Main/Sideビームでトランスインピーダンスを高速化	記録中のサーボ信号生成の方法としてサンプルホールド方式を用いているので、ディテクター信号の高速セトリングが必要となる。特に微小なWobble信号の抽出には高速化が不可欠。
・高速LDモニタPD内蔵	Write&Read用サンプルホールド型APCに対応	記録中のRead/Write Power制御に用いる。これもサンプルホールド方式を用いているので、高速モニタが必要となる。
・高速電流スイッチ内蔵	Read/Write/OverDriveパワー用電流スイッチをLDdriverに内蔵	オレンジブックの各種ライトストラテジー（縦積み／横積み）に対応。
・高周波重畳回路内蔵	高速スイッチング回路をLDdriverに内蔵	ハイパワーレーザのモードホイップ雑音の低減のため。ただし完全スイッチングのため、発振周波数は低い。（100MHz～200MHz）

[Drawing 12]



[Translation done.]

(19)日本国特許庁（JP）　(12)公開特許公報（A）　(11)特許出願公開番号

特開２００１－６７６７４

（P２００１－６７６７４A）

(43)公開日　平成13年3月16日(2001.3.16)

(51)Int.Cl.⁷	識別記号	F I	テーマコード(参考)
G１１B　7/0045		G１１B　7/0045　Z	5D044
20/10	３１１	20/10　３１１	5D090

審査請求　未請求　請求項の数６　OL　（全１１頁）

(21)出願番号　特願平11-243458

(22)出願日　平成11年8月30日(1999.8.30)

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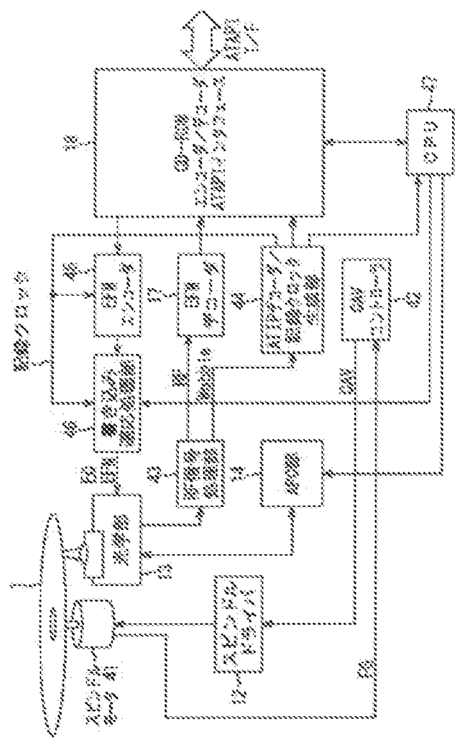
Fターム(参考)　5D044 AB02 BC02 CC04 DE32
5D090 AA01 CC14 CC18 DD03 DD05
EE01 FF07 GG03 KK03 LL01
LL08

(54)【発明の名称】ディスク駆動装置および方法、並びに記録媒体

(57)【要約】

【課題】　迅速に、記録する。

【解決手段】　RF信号処理部４３は、装着されているCD-R１の、ピットトラックの線速度に対応するWobble信号を生成する。ATIPデコーダ／記録クロック生成部４４は、Wobble信号に対応する記録クロックを生成する。EFMエンコーダ４５および書き込み適応処理部４６は、記録クロックに基づいて、CD-R１にデータを記録させる。



【特許請求の範囲】

【請求項１】　装着されている情報記録媒体の、データが記録されるトラックの線速度に対応する線速度信号を生成する線速度信号生成手段と、
前記線速度信号に対応するクロックを生成するクロック生成手段と、
前記クロックに基づいて、前記情報記録媒体に前記データを記録する記録手段とを含むことを特徴とするディスク駆動装置。

【請求項２】　前記線速度信号は、Wobble信号から生成されることを特徴とする請求項１に記載のディスク駆動装置。

【請求項３】　前記記録手段は、前記情報記録媒体に対して前記データを記録する光を発する光発生手段を含み、
前記クロックに基づいて、前記光発生手段を駆動する駆動信号を補正する駆動信号補正手段を更に含むことを特徴とする請求項１に記載のディスク駆動装置。

【請求項４】　前記クロックに基づいて、前記記録手段の前記情報記録媒体に対してデータを記録するレーザ光の強度を調整する調整手段を更に含むことを特徴とする請求項１に記載のディスク駆動装置。

【請求項５】　装着されている情報記録媒体の、データが記録されるトラックの線速度に対応する線速度信号を生成する線速度信号生成ステップと、
前記線速度信号に対応するクロックを生成するクロック生成ステップと、
前記クロックに基づいて、前記情報記録媒体に前記データを記録する記録ステップとを含むことを特徴とするディスク駆動方法。

【請求項６】　装着されている情報記録媒体の、データが記録されるトラックの線速度に対応する線速度信号を生成する線速度信号生成ステップと、
前記線速度信号に対応するクロックを生成するクロック生成ステップと、
前記クロックに基づいて、前記情報記録媒体への前記データの記録を制御する記録制御ステップとを含むことを特徴とするコンピュータが読み取り可能なプログラムが記録されている記録媒体。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、ディスク駆動装置および方法、並びに記録媒体に関し、特に、迅速に、記録ができるディスク駆動装置および方法、並びに記録媒体に関する。

【０００２】

【従来の技術】CD-R (Compact Disc-Recordable) ドライブ装置は、装着されたCD-Rに所定のデータを記録するか、またはCD-Rから所定のデータを再生する。このとき、CD-Rドライブ装置は、CD-Rを、所定のピットトラックの線速度が一定となる回転速度で回転するように、スピンドルサーボをかける。また、光ピックアップに内蔵されるレーザダイオードが発生するレーザ光のレーザスポットが、CD-Rの所定のピットトラックを追従し、データを記録または再生できるように、トラッキングサーボ、フォーカスサーボ、およびスレッドサーボがかけられる。

【０００３】従来のCD-Rドライブ装置の構成について、図１に示すブロック図を参照して説明する。CD-R１は、スピンドルモータ１１により、所定のピットトラックの線速度が一定となる回転速度で回転されるスピンドルに装着される。スピンドルドライバ１２は、ATIPデコーダ１６から供給されるCLV(Constant Linear Velocity)信号を基に、所定のピットトラックの線速度を一定とする回転速度となるように、スピンドルモータ１１を駆動する。

【０００４】光学部１３は、内蔵するレーザダイオード（図示せず）から、CD-R１の信号面に光を照射する。CD-R１の信号面より反射された光は、信号（ピット）の有無および案内溝（プリグルーブまたはガイドグルーブとも称する）により変調されており、光学部１３の検出器で受光される。光学部１３の検出器は、CD-R１からの光を電気信号に変換し、RF (Radio Frequency) 処理部１５に出力する。

【０００５】光学部１３は、また、データをCD-R１に書き込むとき、書き込み適応処理部２１から供給された、EQPEM変調されたデータを基に、レーザダイオードの出力を変化させる。光学部１３は、図示せぬスレッドモータによりCD-R１の半径方向に駆動される。

【０００６】APC (Auto Power Control) 部１４は、CPU (Central Processing Unit) １０の制御に基づき、光学部１３のレーザダイオードの出力を調整する。

【０００７】RF処理部１５は、検出器で検出された信号から、ピットに対応する再生信号（以下、RF信号と称する）を生成し、EFM(Eight to Fourteen Modulation)デコーダ１７に出力する。RF処理部１５は、検出器で検出された信号から、案内溝に対応するWobble信号を生成し、ATIPデコーダ１６に出力する。Wobble信号は、ピットトラックの線速度が一定なので、CD-R１にデータを記録しているとき、またはCD-R１からデータを読み取っているとき、22.05KHz±1KHzの周波数を有する。

【０００８】また、Wobble信号は、周波数変調しており、それを復調した信号のクロック周波数はピットトラックの線速度が一定なので、CD-R１にデータを記録しているとき、またはCD-R１からデータを読み取っているとき、6.30KHzの一定の周波数を有する。

【０００９】RF処理部１５は、また、検出器で検出された信号の加減算処理を行い、トラッキングエラー信号（以下、TE (Tracking Error) 信号と称する）、およびフォーカスエラー信号（以下、FE (Focus Error) 信号

と称する）を生成し、トラッキングサーボ、フォーカスサーボ、およびスレッドサーボを制御する図示せぬサーボドライバに出力する。

【００１０】ATIPデコーダ１６は、RF処理部１５から供給されたWobble信号を基に、光学部１３が光を照射しているピットトラックの線速度を示すCLV信号を生成し、スピンドルドライバ１２に供給するとともに、スピンドルの回転を示すデータをCD-ROM（Compact Disc-Read Only Memory）エンコーダ／デコーダATAPI(AT Attachment Packet Interface)インターフェース１８に出力する。

【００１１】EFMデコーダ１７は、RF処理部１５で生成されたRF信号をEFM復調し、CD-ROM用のフォーマットに変換し、CD-ROMエンコーダ／デコーダATAPIインターフェース１８に出力する。

【００１２】CD-ROMエンコーダ／デコーダATAPIインターフェース１８は、CPU１９の制御の基に、ATIPデコーダ１６またはEFMデコーダ１７から供給されたデータを、ATAPIインターフェースを介して、外部の機器に出力するとともに、外部の機器から供給されたデータをEFMエンコーダ２０に供給する。

【００１３】CPU１９は、CD-ROMエンコーダ／デコーダATAPIインターフェース１８から入力されたデータを基に、CD-ROMエンコーダ／デコーダATAPIインターフェース１８、書き込み適応処理部２１、およびAPC部１４を制御する。

【００１４】EFMエンコーダ２０は、CD-ROMエンコーダ／デコーダATAPIインターフェース１８から入力されたデータに対応するEFM信号を生成し、固定の周波数の記録クロックとともに、書き込み適応処理部２１に出力する。

【００１５】書き込み適応処理部２１は、EFMエンコーダ２０から供給された、EFM信号および記録クロックを基に、EQEFM(Equalized EFM)信号を生成して、光学部１３に供給する。

【００１６】このように、従来のCD-Rドライブ装置は、データを記録または読み出しをしている、ピットトラックの線速度が一定となる回転速度で回転するように、スピンドルサーボをかける。

【００１７】

【発明が解決しようとする課題】しかしながら、従来のCD-Rドライブ装置は、記録したいピットトラックの線速度が一定となるまで、CD-R１の回転数が変化するのを待たなければならず、CD-R１へのデータの記録に時間がかかる。

【００１８】本発明はこのような状況に鑑みてなされたものであり、迅速に、記録ができるようにすることを目的とする。

【００１９】

【課題を解決するための手段】請求項１に記載のディスク駆動装置は、装着されている情報記録媒体の、データが記録されるトラックの線速度に対応する線速度信号を生成する線速度信号生成手段と、線速度信号に対応するクロックを生成するクロック生成手段と、クロックに基づいて、情報記録媒体にデータを記録する記録手段とを含むことを特徴とする。

【００２０】線速度信号は、Wobble信号から生成することができる。

【００２１】記録手段は、情報記録媒体に対してデータを記録する光を発する光発生手段を含み、クロックに基づいて、光発生手段を駆動する駆動信号を補正する駆動信号補正手段を更に設けることができる。

【００２２】ディスク駆動装置は、クロックに基づいて、記録手段の情報記録媒体に対してデータを記録するレーザ光の強度を調整する調整手段を更に設けることができる。

【００２３】請求項５に記載のディスク駆動方法は、装着されている情報記録媒体の、データが記録されるトラックの線速度に対応する線速度信号を生成する線速度信号生成ステップと、線速度信号に対応するクロックを生成するクロック生成ステップと、クロックに基づいて、情報記録媒体にデータを記録する記録ステップとを含むことを特徴とする。

【００２４】請求項６に記載の記録媒体は、装着されている情報記録媒体の、データが記録されるトラックの線速度に対応する線速度信号を生成する線速度信号生成ステップと、線速度信号に対応するクロックを生成するクロック生成ステップと、クロックに基づいて、情報記録媒体へのデータの記録を制御する記録制御ステップとを含む処理を実行させるコンピュータが読み取り可能なプログラムが記録されていることを特徴とする。

【００２５】請求項１に記載のディスク駆動装置、請求項５に記載のディスク駆動方法、および請求項６に記載の記録媒体においては、装着されている情報記録媒体の、データが記録されるトラックの線速度に対応する線速度信号が生成され、線速度信号に対応するクロックが生成され、クロックに基づいて、情報記録媒体にデータが記録される。

【００２６】

【発明の実施の形態】図２は、本発明に係るCD-Rドライブ装置の一実施の形態の構成を示すブロック図である。従来の場合と対応する部分には同一の符号を付してあり、その説明は、適宜省略する。スピンドルモータ４１は、スピンドルを角速度一定である所定の回転速度で回転させる。スピンドルに装着されているCD-R１は、角速度一定である所定の回転速度で回転する。スピンドルモータ４１は、スピンドルの回転速度に比例した電圧を、FG(Frequency Generator)信号として、CAV(Constant Angular Velocity)コントローラ４２に出力する。

【００２７】CAVコントローラ４２は、スピンドルモーター４１から供給されたFG信号を基に、スピンドルモータ

４１が角速度一定である所定の回転速度で回転するように、スピンドルドライバ１２を制御する。

【００２８】RF処理部４３は、検出器で検出された信号から、ピットに対応するRF信を生成し、EFMデコーダ１７に出力するとともに、検出器で検出された信号から、案内溝に対応するWobble信号を生成し、ATIPデコーダ／記録クロック生成部４４に出力する。本発明に係るCD-Rドライブ装置のRF処理部４３がATIPデコーダ／記録クロック生成部４４に出力するWobble信号は、CD-R１の角速度が一定なので、光学部１３が記録または読み取りしているピットトラックの位置によって、その周波数および復調周波数が変化する。

【００２９】ATIPデコーダ／記録クロック生成部４４は、RF処理部４３から供給されたWobble信号を基に、Wobble信号の周波数および復調周波数に対応した所定の周波数の記録クロックを生成して、EFMエンコーダ４５、書き込み適応処理部４６、およびＣＰＵ４７に供給するとともに、スピンドルの回転を示すデータをCD-ROMエンコーダ／デコーダATAPIインターフェース１８に出力する。

【００３０】EFMエンコーダ４５は、ATIPデコーダ／記録クロック生成部４４から供給された記録クロックを基に、CD-ROMエンコーダ／デコーダATAPIインターフェース１８から入力されたデータから、EFM信号を生成して、書き込み適応処理部４６に出力する。

【００３１】書き込み適応処理部４６は、EFMエンコーダ４５から供給されたEFM信号、およびATIPデコーダ／記録クロック生成部４４から供給された記録クロックを基に、EQEFM信号を生成して、光学部１３に供給する。書き込み適応処理部４６は、ＣＰＵ４７から供給されるデータを基に、光学部１３がCD-R１に照射するレーザ光の強度を制御する。＊

＊【００３２】ＣＰＵ４７は、ATIPデコーダ／記録クロック生成部４４から供給された記録クロックの周波数を基に、書き込み適応処理部４６が光学部１３のレーザ光の強度を制御するためのデータを生成して、書き込み適応処理部４６に出力する。

【００３３】CD-R１にデータを記録するとき、光学部１３は、書き込み適応処理部４６から供給された、EQEFM信号を基に、レーザ光の強度を変化させる。

【００３４】図３は、光学部１３の検出器およびRF信号処理部４３の構成を示す図である。光学部１３は、内蔵するレーザダイオードより出射されたレーザ光を、CD-R１の信号面に照射する。このとき、照射される１本のレーザ光は、図示せぬグレイティング（回折格子）により信号読み取り（記録）用の１本のレーザ光、およびトラッキングサーボ用の２本のレーザ光に分割される。すなわち、１本のレーザ光が、グレイティングにより３本のレーザ光に分割される。そして、CD-R１の信号面に３本のレーザ光を照射して得られる反射面からの３本のレーザ光は、それぞれ検出器７１－１乃至７１－３で受光される。

【００３５】検出器７１－１は、CD-R１から反射された信号読み取り用のレーザ光を、４分割されたセンサＡ乃至Ｄで検出し、電気信号AP，BP，CP，およびDPにそれぞれ変換した後、増幅器７２－１乃至７２－４に出力する。増幅器７２－１乃至７２－４は、信号AP乃至DPをそれぞれ増幅し、加算器７３に出力する。

【００３６】加算器７３は、増幅器７２－１乃至７２－４で増幅された信号AP，BP，CP，およびDPを、次式（１）に従って加算することで、RF信号を生成し，EFMデコーダ１７に出力する。

【００３７】

ＲＦ＝（AP＋BP＋CP＋DP）　・・・（１）

増幅器７２－１乃至７２－４はまた、信号AP，BP，CP，およびDPをそれぞれメインサンプルホールド回路７４に出力する。

【００３８】メインサンプルホールド回路７４は、所定のA/D（Analog To Digital）変換の作業が済むまで、信号AP，BP，CP，およびDPをサンプルホールドするとともに、それらの信号を増幅器７５に出力する。メインサンプルホールド回路７４は、CD-R１にデータを書き込んでいるとき、信号AP，BP，CP，およびDPをサンプルホールドして出力し、CD-R１にデータを書き込む前または書き込んだ後、信号AP，BP，CP，およびDPをサ※ンプルのみ行って（ホールドせずに）、増幅器７５に出力する。

【００３９】増幅器７５は、入力された信号APおよびDPを加算して、加算して生成した信号をAGC(Automatic Gain Control)回路７６に出力するとともに、入力された信号BPおよびCPを加算して、加算して生成した信号をAGC回路７７に出力する。

【００４０】増幅器７５は、また、入力された信号AP，BP，CP，およびDPを、次式（２）に従って演算し、FE信号を生成する。

【００４１】

ＦＥ＝（AP＋CP）－（BP＋DP）　・・・（２）

増幅器７５は、更に、入力された信号AP，BP，CP，およびDPから、次式（３）に従って、MPP（Main Push Pull）信号を演算し、スイッチ７９および差動増幅器８★５の＋入力端子に出力する。

【００４２】

ＭＰＰ＝（AP＋DP）－（BP＋CP）　・・・（３）

AGC回路７６は、入力された信号APおよびDPを加算した信号のレベルを所定の基準レベルと比較し、基準レベ

ルと同一のレベルになるように振幅を調整して、差動増幅器７８の＋入力端子に出力する。

【００４３】AGC回路７７は、入力された信号BPおよびCPを加算した信号のレベルを所定の基準レベルと比較し、基準レベルと同一のレベルになるように振幅を調整して、差動増幅器７８の－入力端子に出力する。

【００４４】差動増幅器７８は、振幅が調整された信号APおよびDPを加算した信号と、振幅が調整された信号BPおよびCPを加算した信号との差を算出して、スイッチ７９に供給する。

【００４５】スイッチ７９は、光学部１３から供給された信号を基に、CD-R１にデータを書き込んでいるとき、または書き込む前には、増幅器７５から供給されたMPP信号をバンドパスフィルタ８０に出力し、書き込んだ後には、差動増幅器８５から供給された信号をバンドパスフィルタ８０に出力する。バンドパスフィルタ８０は、スイッチ７９から供給された信号から、所定の周波数以下の成分、および他の所定の周波数以上の成分を除去して、Wobble信号として、ATIPデコーダ／記録クロック生成部４４に出力する。

【００４６】検出器７１－２は、CD-R１から反射されたトラッキングサーボ用の第１のレーザ光を、２分割されたセンサE，Fで検出し、電気信号EP，FPにそれぞれ変換した後、増幅器８１－１，８１－２に入力する。増幅器８１－１，８１－２は、信号EP，FPをそれぞれ増幅し、サイドサンプルホールド回路８３に出力する。検出器７１－３は、CD-R１から反射されたトラッキングサーボ用の第２のレーザ光を、２分割されたセンサG，Hで検出し、電気信号GP，HPにそれぞれ変換した後、増幅器８２－１，８２－２に出力する。増幅器８２－１，８２－２は、信号GP，HPをそれぞれ増幅し、サイドサンプルホールド回路８３に出力する。

【００４７】サイドサンプルホールド回路８３は、A/D変換の作業が済むまで、第１のトラッキングサーボ用の信号EP，FP、および第２のトラッキングサーボ用の信号GP，HPを、それぞれサンプルホールドするとともに、それらの信号を増幅器８４に入力する。サイドサンプルホールド回路８３は、CD-R１にデータを書き込んでいるとき、第１のトラッキングサーボ用の信号EP，FP、および第２のトラッキングサーボ用の信号GP，HPををサンプルホールドして出力し、CD-R１にデータを書き込む前または書き込んだ後、第１のトラッキングサーボ用の信号EP，FP、および第２のトラッキングサーボ用の信号GP，HPをサンプルのみ行って、増幅器８４に出力する。

【００４８】増幅器８４は、入力された信号EP，FP，GP，およびHPから、次式（４）に従って、SPP（Side Push Pull）信号を演算し、差動増幅器８５の－入力端子に出力する。

【００４９】

ＳＰＰ＝（FP＋HP）－（EP＋GP）　　・・・（４）

差動増幅器８５は、入力されたMPP信号、およびSPP信号から、次式（５）に従って、TE信号を演算する。

【００５０】

ＴＥ＝ＭＰＰ－ＳＰＰ　　・・・（５）

次に、本発明に係るCD-Rドライブ装置が、Wobble信号およびCD-ROMエンコーダ／デコーダATAPIインターフェース１８から供給されたデータを基に、CD-R１にデータを書き込む動作を図４のブロック図を参照して説明する。

【００５１】バンドパスフィルタ８０は、検出器７１－１、増幅器７２－１乃至７２－４、メインサンプルホールド回路７４、および増幅器７５で生成されたMPP信号から、所定の周波数成分のみを抽出して、Wobble信号としてATIPデコーダ／記録クロック生成部４４に出力する。

【００５２】CD-R１は、図５および図６に示すように、ポリカーボネートで形成された透過層（基板とも称する）に、予めプリグルーブ（案内溝）が設けられている。CD-Rドライブ装置は、データを読み込むときに比較して、CD-R１にデータを書き込むときには、強いレーザ光を、プリグルーブに沿って照射して、記録層の有機色素を分解し、透過層を変形させることにより、CD-R１にピットを形成させる。CD-R１のプリグルーブは、図６に示すように、プリグルーブの所定の長さに対して、予め定められた数のウォブル（うねり）を有する。従って、プリグルーブから反射したレーザ光は、プリグルーブのウォブルに対応した周期の振動を有する。

【００５３】プリグルーブのウォブルに対応した周期の振動に対応する信号は、Wobble信号として抽出される。すなわち、Wobble信号の周期は、プリグルーブに対する、プリグルーブに照射されたレーザ光の移動速度、言い換えれば、ピットトラックの線速度に対応している。

【００５４】また、Wobble信号は周波数変調しており、それを復調した信号に同期したクロック信号の位相はピットトラックにデータを記録する際の記録クロックの位相と同期している。

【００５５】ATIPデコーダ／記録クロック生成部４４の２値化回路１０１は、供給されたWobble信号を、予め定められた所定の閾値と比較して、２値化して、周波数比較回路１０２に出力する。周波数比較回路１０２は、２値化回路１０１から供給された２値化されたWobble信号と、分周回路１０５から供給された信号とを比較して、Wobble信号と分周回路１０５から供給された信号との周波数差に対応した電圧の信号をローパスフィルタ１０３に出力する。

【００５６】ローパスフィルタ１０３は周波数比較回路１０２から供給された信号から、所定の周波数以上の成

分を除去して、その信号をＶＣＯ(Voltage Controlled Oscillator)１０４に供給する。ＶＣＯ１０４は、ローパスフィルタ１０３とローパスフィルタ１１１から供給された信号の加算後の電圧に対応する周波数の信号を生成して、分周回路１０５および分周回路１１２およびＥＦＭエンコーダ４５に出力する。

【００５７】分周回路１０５は、ＶＣＯ１０４から供給された信号を１／１９６に分周して（例えば、ＶＣＯ１０４から供給された信号が4.3218MHzであれば、22.05KHzになる）、周波数比較回路１０２に出力する。

【００５８】位相比較器１０６は、２値化回路１０１から供給された２値化されたWobble信号とＶＣＯ１０８から供給された信号との位相を比較してその位相差に対応した電圧の信号をローパスフィルタ１０７に出力する。

【００５９】ローパスフィルタ１０７は位相比較器１０６から供給された信号から、所定の周波数以上の成分を除去して、その信号をＶＣＯ１０８に供給する。また、ローパスフィルタ１０７の出力は２値化回路１０９にも供給され、２値化された信号は位相比較器１１０に出力する。

【００６０】位相比較器１１０は２値化回路１０９から供給された２値化されたＦＭＤＴ信号と分周回路１１２から供給された信号との位相を比較してその位相差に対応した電圧の信号をローパスフィルタ１１１に出力する。

【００６１】ローパスフィルタ１１１は位相比較器１１０から供給された信号から、所定の周波数以上の成分を除去して、その信号をローパスフィルタ１０３の出力と加算してからＶＣＯ１０４に供給する。

【００６２】分周回路１１２はＶＣＯ１０４から供給された信号を１／６８６に分周して位相比較器１１０に出力する。

【００６３】ATIPデコーダ／記録クロック生成部４４から、ＥＦＭエンコーダ４５に出力される信号はWobble信号の１９６倍の周波数で、かつＦＭＤＴ信号のクロック周波数と位相が同期し、ＦＭＤＴ信号のクロック周波数の６８６倍の記録クロックとなる。

【００６４】ATIPデコーダ／記録クロック生成部４４は、Wobble信号の周波数が変化したとき、その変化に追従して、まず周波数が上記のようになり、次に位相がＦＭＤＴ信号のクロックに同期するように作用し、記録クロックを生成する。

【００６５】なお、２倍の記録クロックが必要な場合、分周回路１０５の分周率を１／９８，かつ分周回路１１２の分周率を１／３４３にすればよい。

【００６６】EFMエンコーダ４５は、CD-ROMエンコーダ／デコーダATAPIインターフェース１８から供給されたデータを、８ビットのデータに分割して、それぞれを１４ビットの所定のデータに置き換える（置き換えられたデータは、連続する０が２つ以上１０以下になる（１と１との間に、０が１つだけ挟まれることがなく、また１１以上の連続する０が表れることがない））。EFMエンコーダ４５は、ATIPデコーダ／記録クロック生成部４４から供給された記録クロックを基に，１４ビットの置き換えられたデータに１が表れたとき反転する信号、すなわちEFM信号を生成する。

【００６７】EFMエンコーダ４５は、EFM信号を書き込み適応処理部４６に出力する。書き込み適応処理部４６のイコライザ１２１は、入力されたEFM信号を基に、EQEFM信号を生成する。

【００６８】図７は、EQEFM信号およびEQEFM信号を基にCD-R１に生成されるピットを説明する図である。図７（A）に示す記録クロックを基に、EFMエンコーダ４５が、例えば、図７（B）に示すように、１が３つ連続するEFM信号を生成したとき、イコライザ１２１は、記録クロックの１周期だけ短いEQEFM信号を出力する。

【００６９】イコライザ１２１から供給されたEQEFM信号を基に、EFM信号を書き込み適応処理部４６のレーザ駆動回路１２２は、光学部１３にピットを形成させる強度のレーザ光をCD-R１に照射させる。

【００７０】図７（C）に示すEQEFM信号を基に、CD-R１に形成されるピットは、図７（D）に示すように、その長さがEFM信号に対応する長さとなる。図７（D）に示すピットを光学部１３の照射するレーザ光が走査することにより，RF処理部４３が出力するRF信号は，図７（E）に示すように、ピットの長さに対応した信号レベルを有する。

【００７１】図７（E）に示すRF信号から再生される再生２値化波形は、図７（F）に示すように、EFM信号を反転させたものと，同等となる。

【００７２】本発明に係るCD-Rドライブ装置は、CD-R１を角速度一定である所定の回転速度で回転させるので、CD-R１の中心に近い内周のピットトラックとCD-R１の外縁に近い外周のピットトラックとでは，線速度が異なり、また、Wobble信号を基にした記録クロックの周波数が異なる。

【００７３】そこで、図８に示すように、同一のEFM信号から生成されるEQEFM信号は、CD-R１の中心に近い内周のピットトラックにデータを書き込む場合と、CD-R１の外縁に近い外周のピットトラックにデータを書き込む場合とでは異なる。

【００７４】例えば、図８（A）に示すように、記録クロックのN周期，Ｔである EFM信号を基に，CD-R１の中心に近い内周のピットトラックにデータを書き込むとき、EQEFM信号は，記録クロックの（Ｎ－１）周期，Ｔとされる。

【００７５】記録クロックのN周期，ＴであるEFM信号を基に、CD-R１の外縁に近い外周のピットトラックにデータを書き込むとき，EQEFM信号は記録クロックの（Ｎ－Ｘ）周期，Ｔとされる。Ｘは，０以上１以下のいずれ

かの値であり、Xの値の決定の処理をライト・ストラテジィ(Write Strategy)と称する。

【００７６】ライト・ストラテジィの処理は、図９に示すように、CD-R１の中心に最も近いピットトラックから外縁に最も近いピットトラックを、所定の数のM個のゾーン（領域）に分割して、それぞれのゾーン毎に、Xの値を予め決めておいても良い。書き込み適応処理部４６は、ATIPデコーダ／記録クロック生成部４４から供給された記録クロックの周波数を基に、予め記憶しているXの値を選択して、EQEFM信号を生成するようにしてもよい。

【００７７】例えば、CD-R１の中心に最も近いピットトラックが含まれるゾーンである図中のZ(0)においては、Xを１とし、Z(0)の外周側に位置するゾーンであるZ(1)においては、Xを０．９６とし、Z(1)の外周側に位置するゾーンであるZ(2)においては、Xを０．９２とする。例えば、CD-R１の外縁に最も近いピットトラックが含まれるゾーンである図中のZ(M)においては、Xを０．８０とし、Z(M)の内周側に位置するゾーンであるZ(M-1)においては、Xを０．８６とする。

【００７８】また、例えば、ＣＰＵ４７が、ATIPデコーダ／記録クロック生成部４４から供給された記録クロックの周波数を基に、予め記憶しているXの値を選択して、書き込み適応処理部４６に供給し、書き込み適応処理部４６は、供給されたXの値を基に、EQEFM信号を生成するようにしてもよい。

【００７９】更に、ジッタを低減するために、CD-R１にデータを書き込むときの光学部１３のレーザダイオードの出力を、M個のゾーン毎に変更するようにしてもよい。

【００８０】例えば、CD-R１の中心に最も近いピットトラックが含まれるゾーンである図中のZ(0)においては、光学部１３のレーザダイオードの出力を9.0mWとし、Z(0)の外周側に位置するゾーンであるZ(1)においては、レーザダイオードの出力を9.4mWとし、Z(1)の外周側に位置するゾーンであるZ(2)においては、レーザダイオードの出力を9.9mWとする。例えば、CD-R１の外縁に最も近いピットトラックが含まれるゾーンである図中のZ(M)においては、光学部１３のレーザダイオードの出力を12.0mWとし、Z(M)の内周側に位置するゾーンであるZ(M-1)においては、レーザダイオードの出力を11.4mWとする。

【００８１】CD-R１の回転速度が固定されているので、CD-R１の半径方向に対する光学部１３の位置をスレッドサーボから取得すれば、CD-Rドライブ装置は、ピットトラックの線速度が算出できる。CD-Rドライブ装置は、CD-R１の半径方向に対する光学部１３の位置を基に、ライト・ストラテジィの処理を実行し、また、光学部１３のレーザダイオードの出力を決定してもよい。

【００８２】図１０は、CD-Rドライブ装置の光学部１３の構成要件を説明する図である。例えば、光学部１３のレーザダイオードは、最大出力を１３乃至１４mWとし、レーザ光を収束させる対物レンズは、開口数（Numerical Aperture）を0.5とする。また、光学部１３は、高速な検出器７１－１乃至７１－３を使用して、レーザダイオードの出力のモニタには高速フォトダイオードを利用する。レーザ駆動回路１２２には、高速電流スイッチを内蔵するなどである。

【００８３】次に、CD-Rドライブ装置の書き込みの処理を図１１のフローチャートを参照して説明する。ステップＳ１１において、RF処理部４３は、光学部１３の検出器７１－１乃至７１－３から供給された信号を基に、Wobble信号を生成して、ATIPデコーダ／記録クロック生成部４４に出力する。ステップＳ１２において、ATIPデコーダ／記録クロック生成部４４は、RF処理部４３から供給されたWobble信号を基に、Wobble信号の周波数に対応する、所定の周波数の記録クロックを生成して、EFMエンコーダ４５および書き込み適応処理部４６に供給する。

【００８４】ステップＳ１３において、EFMエンコーダ４５は、CD-ROMエンコーダ／デコーダATAPIインターフェース１８を介して、データを入力する。ステップＳ１４において、EFMエンコーダ４５は、記録クロックを基に、入力されたデータに対応するEFM信号を生成して、書き込み適応処理部４６に出力する。ステップＳ１５において、書き込み適応処理部４６は、ATIPデコーダ／記録クロック生成部４４から供給された記録クロックを基に、ライト・ストラテジィの処理を実行して、EFM信号からEQEFM信号を生成する。

【００８５】ステップＳ１６において、書き込み適応処理部４６は、ATIPデコーダ／記録クロック生成部４４から供給された記録クロックを基に、光学部１３のレーザダイオードの書き込み光出力を設定する。ステップＳ１７において、光学部１３は、書き込み適応処理部４６供給されたEQEFM信号を基に、CD-R１へのデータの書き込みを実行する。

【００８６】以上のように、本発明に係るCD-Rドライブ装置は、CD-R１を、角速度一定である所定の回転速度で回転させて、CD-R１にデータを書き込むことができる。CD-Rドライブ装置は、CD-R１の回転速度を変化させずにデータを書き込むので、線速度一定でデータを書き込む場合に比較して、CD-R１の回転の速度の変化を待つ時間がなくなり、迅速にデータを書き込むことができる。

【００８７】また、スピンドルモータ４１が一定の速度で回転するので、CAVコントローラ４２は、従来のCD-Rドライブ装置のATIPデコーダ１６に比較して、簡略な回路で構成できる。スピンドルモータ４１の出力も少なくできるので、スピンドルモータ４１の発熱量も少なくなり、また、消費電力も少なくすることができる。

【００８８】以下において、CD-Rドライブ装置として説

明したが、CD-RW (Compact Disc-ReWritable) ドライブ装置でもよい。

【００８９】上述した一連の処理は、ハードウェアにより実行させることもできるが、ソフトウェアにより実行させることもできる。一連の処理をソフトウェアにより実行させる場合には、そのソフトウェアを構成するプログラムが、専用のハードウェアに組み込まれているコンピュータ、または、各種のプログラムをインストールすることで、各種の機能を実行することが可能な、例えば汎用のパーソナルコンピュータなどに、記録媒体からインストールされる。

【００９０】この記録媒体は、図１２に示すように、コンピュータとは別に、ユーザにプログラムを提供するために配布される、プログラムが記録されている磁気ディスク３５１（フロッピディスクを含む）、光ディスク３５２（CD-ROM(Compact Disc-Read Only Memory)、ＤＶＤ(Digital Versatile Disc)を含む）、光磁気ディスク３５３（ＭＤ(Mini-Disc)を含む）、若しくは半導体メモリ３５４などよりなるパッケージメディアにより構成されるだけでなく、コンピュータに予め組み込まれた状態でユーザに提供される、プログラムが記録されているROM３０２や、記憶部３０８に含まれるハードディスクなどで構成される。

【００９１】なお、本明細書において、記録媒体に格納されるプログラムを記述するステップは、記載された順序に沿って時系列的に行われる処理はもちろん、必ずしも時系列的に処理されなくとも、並列的あるいは個別に実行される処理をも含むものである。

【００９２】また、本明細書において、システムとは、複数の装置により構成される装置全体を表すものである。

【００９３】

【発明の効果】請求項１に記載のディスク駆動装置、請求項５に記載のディスク駆動方法、および請求項６に記載の記録媒体によれば、装着されている情報記録媒体の、データが記録されるトラックの線速度に対応する線速度信号が生成され、線速度信号に対応するクロックが生成され、クロックに基づいて、情報記録媒体にデータが記録されるようにしたので、迅速に、記録ができるようになる。

【図面の簡単な説明】

【図１】従来のCD-Rドライブ装置の構成を説明する図である。

【図２】本発明に係るCD-Rドライブ装置の一実施の形態の構成を示すブロック図である。

【図３】光学部１３の検出器およびRF信号処理部４３の構成を示す図である。

【図４】本発明に係るCD-Rドライブ装置のデータを書き込む動作を説明するブロック図である。

【図５】CD-R１の構造を説明する図である。

【図６】CD-R１の構造を説明する図である。

【図７】EQEFM信号およびEQEFM信号を基にCD-R１に生成されるピットを説明する図である。

【図８】ライト・ストラテジィを説明する図である。

【図９】ゾーン毎のライト・ストラテジィおよびレーザダイオードの出力の調整を説明する図である。

【図１０】CD-Rドライブ装置の光学部１３の構成要件を説明する図である。

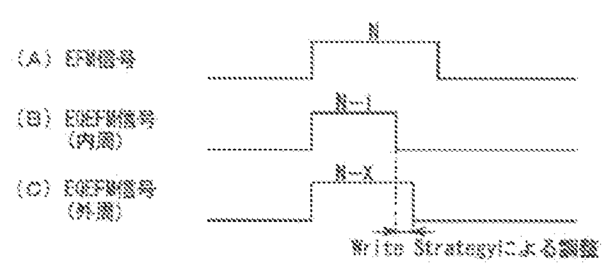
【図１１】CD-Rドライブ装置の書き込みの処理を説明するフローチャートである。

【図１２】記録媒体を説明する図である。

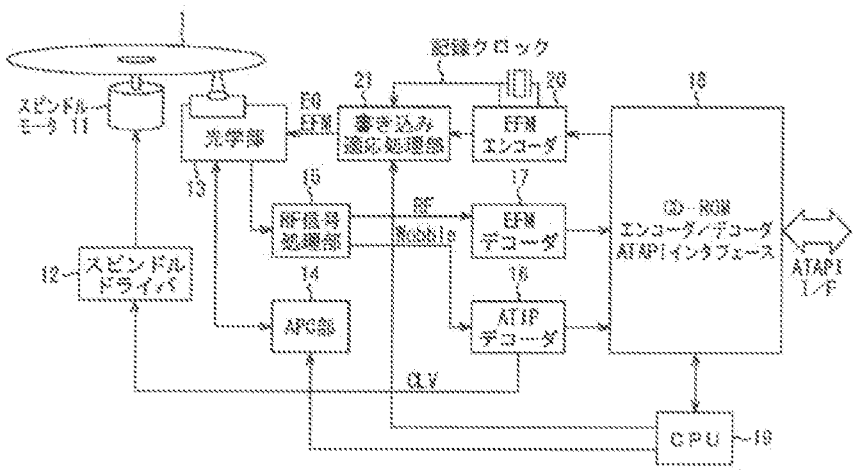
【符号の説明】

４１　スピンドルモータ，　４２　CAVコントローラ，　４３　RF処理部，４４　ATIPデコーダ／記録クロック生成部，　４５　EFMエンコーダ，　４６書き込み補償処理部，　４７　ＣＰＵ，　１０１　２値化回路，　１０２　周波数比較回路，　１０３　ローパスフィルタ，　１０４　ＶＣＯ，　１０５　分周回路，　１０６　位相比較回路，　１０７　ローパスフィルタ，　１０８　ＶＣＯ，　１０９　２値化回路，　１１０　位相比較回路，　１１１　ローパスフィルタ，　１１２　分周回路，　１２１　イコライザ，　１２２　レーザ駆動回路，　３０１　ＣＰＵ，　３０２　ＲＯＭ，　３０３　ＲＡＭ，　３０８　記憶部，　３５１　磁気ディスク，　３５２　光ディスク，　３５３　光磁気ディスク，　３５４　半導体メモリ

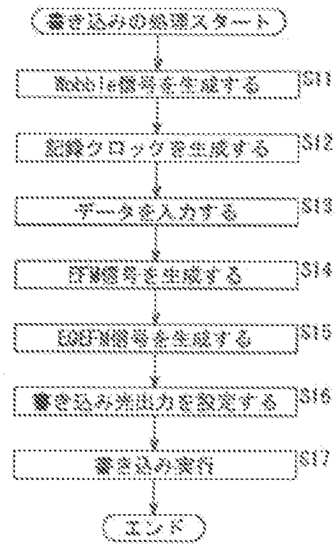
【図８】



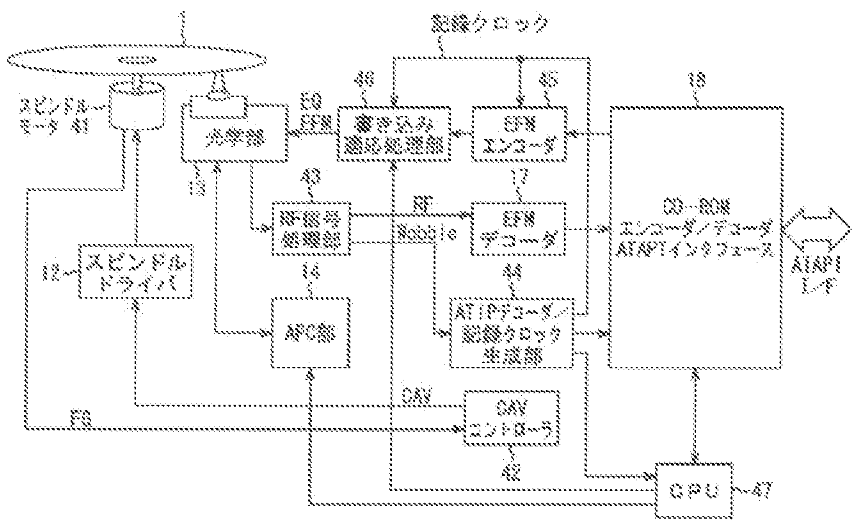
【図１】



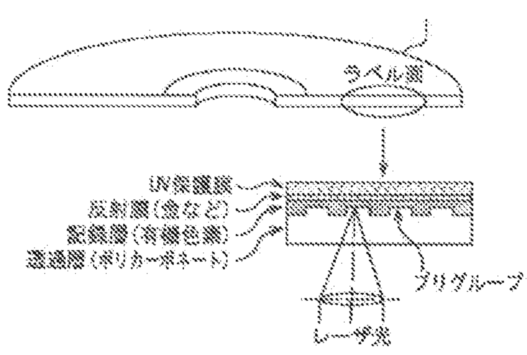
【図１１】



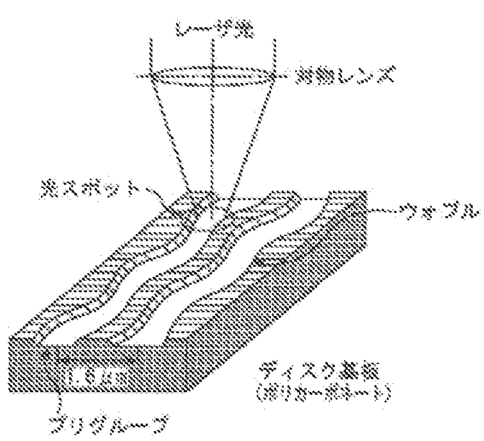
【図２】



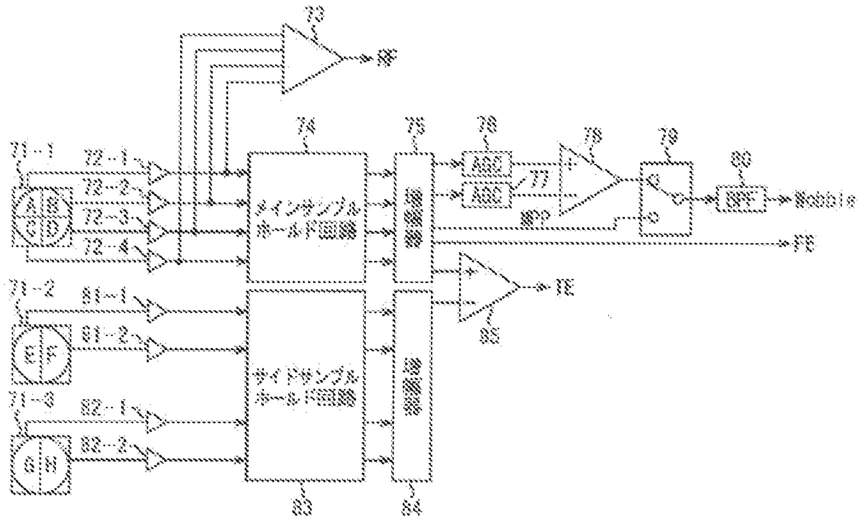
【図５】



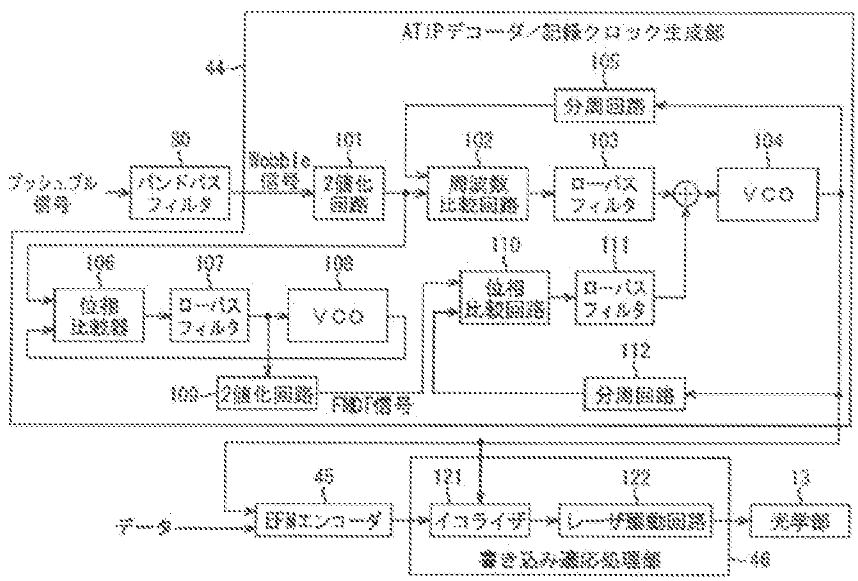
【図６】



【図３】



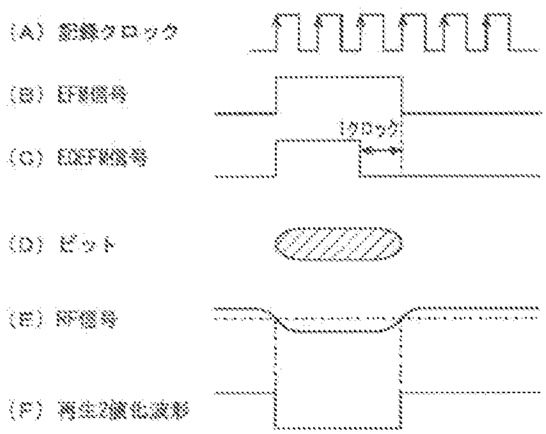
【図４】



【図９】

ゾーン	Z0	Z1	Z2	・・・	Z(N−1)	Z(N)
アドレス (MSF)	00:02:00〜 04:59:74	05:00:00〜 09:59:74	10:00:00〜 14:59:74	・・・	65:00:00〜 69:59:74	70:00:00〜 74:59:74
記録クロック (MHz)	4.3218〜 4.9688	4.9688〜 5.3587	5.3587〜 5.8266	・・・	9.2023〜 9.7037	9.7037〜 10.0378
書き込み電力 (mW)	9.0	9.4	9.8	・・・	11.4	12.0
ライト・ストラテジィ	N−1	N−0.96	N−0.92	・・・	N−0.86	N−0.80

【図７】



【図１０】

項目	説明	理由
・ハイパワーレーザ搭載	対物レンズ出射最大13～14mW（ただし倍速記録時）	各種CD－Rディスク（1.2m/s, 1.4m/s）の倍速記録に対応する。
・高NA対物レンズ	NA=0.6	記録後のディスクの高品質化（低ジッタ化）のために、ビーム形状を絞る。
・DPP方式によるトラッキングエラー検出	TE=MPP－SPP ((A+D)－(B+C))－((F+H)－(E+G))	内周側トラックの影響があるため、記録中のサーボ信号生成にはビームPush-pull法もしくはDPP法しか選択肢がない。
・高速セトリング8分割PDIC内蔵	Read Sampling方式DPPサーボに対応 Main/Sideビームで トランスインピーダンスを最適化	記録中のサーボ信号生成の方法として サンプルホールド方式を用いているので、ディテクター信号の高速セトリングが必要となる。特に微小なWobble信号の抽出には高速化が不可欠。
・高速LDモニタPD内蔵	Write&Read用サンプルホールド型APCに対応	記録中のRead/Write Power制御に用いる。これもサンプルホールド方式を用いているので、高速モニタが必要となる。
・高速電流スイッチ内蔵	Read/Write/OverDriveパワー用電流スイッチをLDriverに内蔵	オレンジブックの各種ライトストラテジー（低積み/高積み）に対応。
・高周波重畳回路内蔵	高速スイッチング回路をLDriverに内蔵	ハイパワーレーザのモードホイップ雑音の低減のため。ただし完全スイッチングのため、高周波重畳は低い。（100MHz～200MHz）

【図１２】